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CONSTRUCTION AND RELATED INDUSTRIES

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CONSTRUCTION PLANNING AND ECONOMICS

COMPUTERS HELP RESOLVE CONSTRUCTION PROBLEMS IN KIEV

Kiev RABOCHAYA GAZETA in Russian 23 Aug 83 p 2

[Article by A. Omel'chenko, chief engineer for the Main Administration for Housing and Civil Engineering Construction of the Kiev Gorispolkom: "Construction Specialty of the Computer"]

[Text] Every year in Kiev over a thousand facilities are erected through the efforts of the glavk [main administration]: residences and children's preschool institutions, schools and hospitals, stores and personal service centers, monuments and memorial complexes. Quite frankly, the work volumes are huge, and it will be impossible to complete without significant improvement in the organizational-technical level of construction. It is specifically the improvement of management, the introduction of achievements in science and technology that comprises the main reserve for the growth of labor productivity and its quality. This is the target presented to builders by the resolution of the CPSU Central Committee and the USSR Council of Ministers, "On Improving Planning and Strengthening the Effect of the Economic Mechanism on Increasing the Effectiveness of Production and the Quality of Work," and by the decisions of the 26th CPSU Congress and the November (1982) and June (1983) Plenums of the Party Central Committee.

We are speaking primarily of industrializing construction. Let us say, for example, that the application of prefabricated reinforced concrete and the development of a system of house-building combines in our glavk has made it possible to transfer many labor consumptive processes from the construction sites to the plants and to turn the construction sites into a mechanized assembly line for buildings made of large-panel elements. The second means of acceleration is work specialization. Today the composition of Glavkievgorstroy, aside from the three house-building combines and eight general construction trusts, includes tens of specialized subsections: finishers, electrical installers, mechanizers, transport workers, sanitation technicians, and others. The advantages of such division of labor are apparent -- the work is performed in technological sequence, more rhythmically.

However, on the other hand industrialization and specialization significantly complicate production management. The product nomenclature is expanded -- today the glavk plants manufacture over 5,000 types of reinforced concrete constructions, the number of construction assembly-line participants is increasing and they are more dependent on one another. Disruption in the work

of one segment is immediately reflected in the work of other contiguous ones. Also, it becomes impossible to prevent these disruptions by the old methods of management.

Let us cite this example. Three years ago almost half of the commercial mortar was prepared at small on-site installations which were serviced by over 1,000 people. At the same time, the capacities of mortar-concrete plants remained underutilized. The paradox in this situation was explained by the fact that it was impossible to manually compute the need for mortar at hundreds of construction sites, particularly with breakdown into shifts. This meant that idle time for people and technology was inevitable. Therefore it was necessary to go to considerable expense in setting up mortar-mixing installations in order to avoid more significant losses.

In planning by the traditional methods, the primary work indicator for plants were cubic meters of reinforced concrete, square meters of carpentry products, etc. However, noone computed their delivery by set, in given nomenclature, and on schedule. This, obviously, was a great drawback. The necessary parts were brought to the construction site at the wrong times. Sometimes the plants, in order to save their own plan, raced ahead with the production of volume panels and did not make the small fitting parts in time. The result was a breakdown in the schedules for operational introduction of the facilities.

Under conditions of an automated control system [ASU], the product nomenclature is entered into the plan rather than a group of products. The economic accounting administration "ASUstroy" was created in the glavk for this very purpose. It performs all work on the development and introduction of automated systems of construction management, and at the same time is, one might say, its monopolist in operation -- there are no such special services at the trusts and house-building combines. The functions of informational and organizational accompaniment of operating ASU are also given over to the "ASUstroy" administration, which has made it possible to reduce several times over the number of specialists engaged in this work.

Let us take, for example, the house-building combines. The control of all their segments is implemented with the aid of electronic computers. They plan the product output by prefabricated reinforced concrete plants, keep an accounting of the finished production stored at warehouses, and formulate the transport-technological cards by series of apartment buildings.

We have mentioned only a part of the computer's "specialties". They also implement control over the fulfillment of a given program, and where there is strict control there is also discipline, reduction in work time losses, and increased labor productivity. One other thing is important: the enterprise sections are freed from collecting and processing the reports of building organizations and from formulating monthly deliveries.

The automated system of control over the production and complete deliveries of carpentry products, developed by our "ASUstroy" administration in conjunction with scientists at the Kiev Engineering-Construction Institute, is in its second year of operation in the glavk system. The economic effect

from its introduction has been 100,000 rubles in the past year alone. We believe this figure needs no comment.

Earlier we already commented on the expense associated with lack of coordination in the provision of commercial mortar to construction sites. With the introduction of the first phase of ASU "Rastvor" [Mortar] -- it was also developed by specialists from "ASUstroy" -- numerous problems have been solved. The computer precisely plans the work of the plants -- the producers of commercial mortar and the auto transport engaged in its transport -- with consideration for the needs of the construction crews. Practically all the mortar is brought to the site in a centralized manner, with almost half of it delivered by the beginning of the work shift. There is no longer a need for on-site mixing facilities and a large number of workers have been freed. On the whole, the economic effect of this innovation is valued at 300,000 rubles. This is for the past year alone.

This year we plan to introduce the second phase of the "Rastvor" system. The computer will take on the accounting and analysis of fulfillment of the operative schedules for the manufacture and delivery of commercial mortar, the accounting between the manufacturing plants, the auto transport enterprises and the construction organizations, and the computation of tariff sanctions for disruption of the schedules.

The conclusion of testing and the full operational introduction of the automated system of control over the production and complete delivery of pre-fabricated reinforced concrete is also proposed for this year. According to the computations performed by the NIIASS, balance in the operation of the technological lines at plants in the reinforced concrete industry, transport means and installers collectives, as well as precise accounting and timely control of plan fulfillment for set deliveries of prefabricated reinforced concrete will make it possible to obtain 20,000 rubles of economic effect per one million rubles of construction-installation work.

Naturally, an increase in the volumes of construction also requires a significant improvement in the activity of the construction subdivisions themselves. Without strict definition and, of course, fulfillment of routine assignments, monthly and quarterly plans this cannot be achieved. In order to resolve the problems which have arisen, the "ASUstroy" together with the UkrSSR Gosstroy Scientific-Research Institute on Building Production, at present for experimental purposes, has introduced at the "Kievgorstroy-5" and "Kievgorstroy-7" trusts a system of operative planning of construction-installation work. The positive shifts are obvious. However, there is still much to be done before the automated control system can encompass all the trusts. Production norms must be developed and transferred to machine storage.

That which has been achieved, however, does not mean that the construction conveyor operates without any disruptions. There are still many difficulties. It has become a poor rule that a number of clients do not present the project estimate documentation in time, and often it is incomplete and substandard. The appropriate sections of glavk, together with the project design organizations,

are faced with further work on the unification of reinforced concrete and carpentry products.

The psychological barriers have also not been totally overcome. Certain subdivision managers believe that it is better to work in the old way. Give us the resources, they say, and we will handle the plan without computers, even though it is specifically the computers which help to liquidate the shortage of products. Thus, for example, at the DSK-3 a complex of problems was introduced for daily planning of construction-installation work, transport and delivery of panel sets to the sites. The work experience of the installer crew headed by N. V. Koval'chuk and others shows that by working according to the "Komplekt-2" system it is possible to significantly reduce the time for assembly of large-panel houses. However, the combine management, happy with the favorable overall results, is in no hurry to transfer all the crews to work according to this system.

We would also like to address another problem. According to the order established by the USSR Ministry of Finance, expenditures for the maintenance and operation of one's own computer technology, as well as for payment of work performed by contract with computer centers, must be related to maintenance of the management staff. Accordingly, the requirement is set to make cutbacks in the staff of certain categories of specialists. However, practice has shown that the application of ASU does not reduce the management staff. Only the functions of the workers change, while requirements for them increase. The machine will be able to compute optimal solutions when the work is fed into it by trained people. Therefore, under ASU conditions, the specialist who is well acquainted with production processes and computer technology capabilities becomes most valuable.

Computer technology does not replace specialists. It helps them to better organize production processes, to more reliably provide sites with the necessary materials and products, and to optimally plan the load on contracting and subcontracting organizations. This, in turn, leads to a reduction in the construction time, an acceleration of erecting facilities and capacities, and to a growth in labor productivity. This means that the expenditures used to pay for this technology must be related not to the maintenance of the management staff, but to the production activity or to means of introducing new technology. Such an order will make room for the more widespread introduction of automated control systems in construction.

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CONSTRUCTION PLANNING AND ECONOMICS

KAZAKH GOSSTROY CHAIRMAN UNDERSCORES ACHIEVEMENTS

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 14 Aug 83 p 3

[Article by A. Bektemisov, chairman of the Kazakh SSR Gosstroy: "The Creation Industry: Today is the Day of the Builder"]

[Text] In our republic, the builders and workers of the industry of construction materials and the designers are observing their professional holiday in a situation of high labor and political activity aimed at the successful realization of the decisions of the 26th Congress of the CPSU, the 15th Congress of the Communist Party of Kazakhstan, and the November 1982 and June 1983 Plenums of the CPSU Central Committee.

Kazakhstan's many thousands of builders have always made a big labor contribution to our republic's economic, social, and cultural development. The construction industry is equipped with modern technology. It is capable of successfully resolving exceptionally complex, responsible, and extensive problems in the future development of energetics, chemistry, petroleum refining, and ferrous and non-ferrous metallurgy, and in the development and strengthening of the agricultural economy. Our republic has risen to first place in the country in length and building of highways and the construction and assembly of hydrotechnical irrigation systems. Beautiful cities and settlements have sprung up, built with regard to the modern requirements of architecture and city planning.

It is enough to say that in 2½ years of the current five-year plan we have assimilated 16 billion rubles and put into service fixed capital worth 15 billion rubles. Behind these figures stand new electrical stations, mines, pits, plants, factories, well-built residential buildings, many structures with cultural purposes, and transportation. An increased program of erection of facilities for enterprises in comparison with last year is going to be fulfilled in the current year. Not for nothing is construction called the creation industry. Everything we do is done for the good of Soviet man.

Every day in the various parts of our republic, state commissions sign documents concerning the acceptance and putting into service of new plants, mines, capacities and technological lines for the manufacture of industrial products, consumer goods, and food products.

Our builders make a large contribution toward realization of the country's Food Program. Some one billion rubles of capital investment are allocated yearly to the building of agricultural production projects. This alone gives the Kazakh SSR Ministry of Agriculture the opportunity to put into service complexes for the production of milk with an average of 10,000 cows, the raising and fattening of 50,000 pigs, sheepfolds for 20,000 head, and also a large number of poultry factories, plants for the manufacture of bone meal, state breeding stations, and hothouses. In addition, capacity for the storage of some 700,000 tons of grain and many other facilities are turned over in the rural areas.

The scope of residential construction is tremendous. Today our republic has reached such a level that every workday some 300 new well-built apartments and one 100-child kindergarten emerge from the construction conveyor. Every two days, a school for 600 pupils is finished. Each work week--a 90-bed hospital, a 105-place polyclinic, and a club with a 400-person capacity.

In our republic, the improvement of the chain of automobile roads continues at a mighty pace. In only the 2½ years of the 11th Five-Year Plan, the efforts of Kazakhstan's roadbuilders have ensured a tremendous growth of hard-surfaced automobile roads. In this regard, not only roads of state and republic importance, but also oblast, local and (which is particularly important) interorganizational roads have received further development. The decisions of the May 1982 Plenum of the CPSU Central Committee aim at their accelerated construction.

A mighty base of the construction industry has been created and is continuing to be developed in our republic. Many types of construction materials and products have been delivered to us in large quantities only comparatively recently. Today Kazakhstan's construction base is a mighty, technologically-equipped branch with a considerable number of enterprises, a large amount of fixed capital, and many workers. More than 7 million tons of cement, as many cubic meters of prefabricated reinforced-concrete constructions and products, 600 thousand tons of steel constructions, and 2½ billion pieces of conventional brick and wall materials are being produced. The production of sanitary and electrical technological equipment and of acid-proof articles is under way in the branch.

Possessing a firm material and technological base, having rich experience and practice, our builders have set about the conclusion of very complex programs of economic and social development in the republic's regions--the Pavlodar-Ekibastuz, Karatau-Dzhambul, and the Mangyshlak territorial-industrial complexes. Thus, the Ekibastuz energy system that is being created by the builders' hands by 1990 will give the national economy more than twice as much electrical energy than is produced in our republic at the present time, twice the level for the whole country in 1940.

The comprehensive mastering and refining of phosphoric raw materials in Kazakhstan's south allows supplying not only the republic's agricultural economy with valuable fertilizer, but also its delivery beyond the republic's boundaries.

Exceptionally important for the development, extraction and refining of oil in the Caspian region is the rapid mastery of the rich Buzachinskiy deposit. The completion in it of all work foreseen by the plan involves this kray's underground wealth in the economic turnover. The workers of some 30 construction and installation organizations are now laboring there under difficult climatic conditions.

The achievements of the republic's builders have become possible thanks to the improvement of the management system and the employment of the achievements of science, technology, and leading experience. In the well-known resolution of the CPSU Central Committee and the USSR Council of Ministers "On the Improvement of Planning and the Increase of the Influence of the Economic Mechanism on Raising the Efficiency of Production and the Quality of Work," one of the most important ways of accelerating the pace of construction and improving the technological and economic indexes in the industry is seen in the active use of progressive forms of labor, in particular the brigade cost-accounting method. Practice bears witness to the evident advantages of such a form of work.

In our republic are operating 14,000 brigades of various construction subordinations, 5,000 of them cost-accounting. But despite the fact that a little more than a fourth of the workers amalgamated into brigades are employed on a cost-accounting basis, these 5,000 collectives carry out more than 40 percent of the general construction and installation. Thus, the experience of Pavlodarsel'stroy trust No 5 merits attention. Two years ago, it occupied a place among the unprofitable, and relied upon small, specialized brigades for work. Their consolidation and transfer to cost accounting and the complex of measures for the reorganization of the collective's production and social life brought good fruit. The trust began to turn a profit. Labor productivity has risen by 11 percent since the beginning of the five-year plan. There have also been considerable achievements in this regard in the Chiment-promstroy and Kazakhtransstroy trusts and in many other subdivisions of all the construction ministries.

An integral link in the whole construction process is planning, one of the most important factors in scientific and technological progress. A large network of planning and research organizations has been created in Kazakhstan; in it are employed some 50,000 engineering and technological workers. They annually provide planning and budgetary documentation worth more than 90 million rubles. Having widely spread socialist competition under the slogans "The 11th Five-Year Plan--Shock Work" and "Work Without Lagging Behind," the republic's planners successfully fulfilled the planned tasks of the first half-year of the five-year plan's core year.

Great is the organizing role of the construction ministries and departments in the struggle to raise the efficiency of capital investments, and this also means capital construction as a whole. We understand that there are still many unsolved problems here. Their successful solution is our main task. As General Secretary of the CPSU Central Committee Yu. V. Andropov stated at the November 1982 Plenum of the CPSU Central Committee, the main task of the ministries' workers; of their party, trade union, and Komsomol organizations;

and of all the collectives of the construction subdivisions is to sharply raise responsibility for fulfillment of plans for assimilating capital investments, to achieve the timely delivery of projects under way. The steady growth of labor efficiency on the basis of accelerating scientific and technological progress and leading experience, curtailing losses of time, strengthening discipline at every work place, the maximum employment of available production reserves--here are the paths to the achievement of high production results.

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CONSTRUCTION PLANNING AND ECONOMICS

GOSSTROY OFFICIAL DISCUSSES LABOR PRODUCTIVITY LAG

Moscow STROITEL'NAYA GAZETA in Russian 4 Sep 83 p 2

[Article by V. Rogonov, deputy division director, USSR Gosstroy: "The Speed Which We Select"]

[Text] Speed has come to be a symbol of our fast-moving age. If you stand still you will hopelessly fall behind. If you dawdle you will lose ground. Problems of selection no longer exist, because of two speeds we are forced to prefer that which is greater. This is true in all cases, including also in economics. Thus, labor productivity is also speed. The more goods we produce in a unit of time, the higher our standard of living, and vice versa.

As yet our economic system is not the "fastest," if we may use this expression. Labor productivity in a number of countries is higher than ours. But this is only for the time being, because the gap is narrowing. For example, in construction our labor productivity has grown 5.1-fold in the years 1951-1980, while in the USA it has grown by only 25 percent, in the FRG -- by 4.6 times, in Japan -- 2.8 times. If this continues, sooner or later we will catch up with these countries and surpass them. That is obvious.

However, everything is not going as we would like. The growth rate in construction labor productivity has slowed. While in the 9th Five-Year Period its average annual growth comprised 5.2 percent, in the 10th it was only 2.1 percent.

In the current 5-year period all of the building ministries (with the exception of Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises]) are not fulfilling the plan for growth in labor productivity. Last year the USSR Minsel'stroy [Ministry of Rural Construction] even reduced its output below the 1980 level. Of the overall number of construction-installation trusts, associations and equivalent organizations, over half did not fulfill the plan assignments for increasing labor productivity in 1982. In the USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises], USSR Minpromstroy [Ministry of Industrial Construction], USSR Minsel'stroy [Ministry of Rural Construction], USSR Minenergo [Ministry of Power and Electrification] and Minvostokstroy [Ministry of Construction in the Far East and Transbaikal Regions] the relative share of such organizations exceeded 60 percent.

What is the problem? What is hindering the growth in speed characteristics of building production? The overwhelming majority of managers explain the

unfavorable state of affairs in construction by reasons which are beyond their control. Here we have poor material-technical provision, the absence of high productivity technology and transport means, and the unbalanced nature of the work program with the material-technical and labor resources... All this is the truth, but not the whole truth. I would say it is a half-truth. This is because, as analysis has shown, the basic reasons for slowing of the growth rate in labor productivity are:

- shortcomings in the work of the ministries, departments and construction-installation organizations on improving the technical level of production;
- poor utilization of construction technology;
- incomplete use of capacities in the building production base;
- weak organization of production, labor and management at construction sites.

The solution to the problem is seen in the intensification of production, in a radical improvement of the utilization of available resources.

Let us take industrialization of the construction process. Efforts should be directed not so much at the application of prefabricated constructions as toward the improvement of their quality, level of construction readiness and plant finishing.

Nevertheless, up to 40 percent of the prefabricated reinforced concrete and over 70 percent of the woodworking production delivered to the construction sites is of low plant readiness. Carpentry products are made of low grade wood with excess moisture content. Most of the window and door frames are delivered unpainted, without glass, and without installation of hardware. All this causes great labor expenditures at the construction site to finish the constructions and products and to eliminate their defects. Studies conducted in the current year by the All-Union Scientific-Research and Project Design Institute on labor in construction showed that these expenditures on the average reach 8 percent of the total work time, while in the USSR Min-sel'stroy Orelsel'stroy Trust they are 19.6 percent, and in trust 32 of the USSR Minpromstroy Minskpromstroy association they are 11.7 percent. The greatest part of these expenditures goes for plastering and float-work on prefabricated reinforced concrete, making openings in constructions and bringing them to the necessary state of installation readiness. In accordance with this, the greatest portion of non-productive labor expenditures occurs with building construction installers (24.9 percent), plasterers (10.4 percent) and painters (10 percent).

The reserves at house-building combines are also great. At most of the house-building combines around half of all finishing work could be done under plant conditions. Thus, at the Tbilisi DSK-1 [House-Building Combine], the overwhelming number of additional finishing and sizing operations on wall panels, as well as the installation and repair of carpentry products is done directly at the construction site.

And what is the situation in the construction of fully prefabricated facilities of production function? Investigations show that the number of fully prefabricated facilities includes around 60 percent of buildings and structures with a large volume of partitions made of brick or other small-piece materials. The level of prefabrication is low at subsidiary-auxiliary facilities (substations, pumping stations, dining, domestic and warehouse facilities), whose area is rather significant: up to 20 percent in industrial and up to 40 percent in agricultural construction. The labor consumption in the construction of subsidiary-auxiliary brick buildings during the reconstruction of industrial enterprises is three to five times higher than the construction of the main production buildings.

The utilization of small-scale mechanization and mechanized instrumentation is also unsatisfactory. Their application within standard assortments intended for work performed by obligatory technology promises a rather sizeable effect: the output in real indicators for plastering, painting and concrete work is increased by 1.5-2 times. Evidence of this is the work experience of the leading crews at the Glavsreduralstroy of the USSR Mintyazhstroy and the Glavzapstroy of the USSR Minstroy. However, the experience of these pace-makers has not yet become a universal achievement. The provision of builders with means of small-scale mechanization, tools and equipment also leaves much to be desired.

Along with this, it is time to seriously begin improving the utilization of the basic machine pool. The average work duration of the machines has remained at the level of 10-12.5 hours per day for a period of many years. Intra-shift idle time, according to the data of random sampling, comprises 15.5 percent in the organizations of the USSR Minpromstroy, 15.4 percent at the USSR Minmontazhspetsstroy, and 17.7 percent at the USSR Minenergo. These idle times are significantly higher at individual building organizations. In 1982 they comprised 27.6 percent at the Slavyansk sel'stroy Trust, 24.5 percent at the Nikolayevsel'stroy Trust, 27 percent at the Kalugasel'stroy Trust, and 23.2 percent at the Zhilstroy Trust of Glavtashkentstroy.

Is it any wonder, then, that around half of all builders are engaged in manual labor? The level of application of manual labor is even higher on such types of work as concrete (52 percent), masonry and furnace (89.4 percent), joining and carpentry (75.9 percent), plastering, painting and finishing (71.3 percent).

Project designers also introduce their "bit." Their underfulfillment in project design decisions hinders the improvement in work production technology. It is specifically in this area that the reserves in labor productivity growth are most ample. Here is an example. At the present time, over 85 percent of the total volume of monolith concrete and reinforced concrete is placed with the aid of cranes, and about 80 percent of concrete work is done with the aid of wood casings. With such technology, the standard expenditures of manual labor, for example for the installation of monolith foundations, reach 90-95 percent. At the same time, the craneless method of placing concrete with the aid of concrete pumper trucks equipped with booms and concrete chutes, combined with the use of stock re-usable casings and effective vibration devices, makes it possible to reduce the labor consumption for concrete work by 10-12 times.

Project designers and builders make insufficient use of new technology and foremost domestic and foreign experience. The situation is becoming a paradox. A number of progressive work production methods developed in the USSR are being used on an incomparably larger scale in foreign construction. For example, we practically do not use trenchless laying of communication lines by the pneumatic punch method, which is widely used under our license in the construction of the FRG, France, Canada, and other countries. The technology of volume-block house building which we developed and which makes it possible to increase plant prefabrication to 85-90 percent, to reduce labor expenditures at the construction site by 2.5-3 times as compared with large-panel house building, and to reduce building time by 3-4 times, is used in domestic construction on a much smaller scale as compared with certain foreign countries.

We must be bolder in introducing and perfecting the brigade contract system, particularly the specific form of the start-to-finish, continuous-flow contract. We must resolutely combat losses in work time and nonproductive labor expenditures, which in construction comprised 15-20 percent of the work time fund.

Only coordination and precision in the work of all the segments will enable us to realize the available reserves and to achieve a high labor productivity. Both the sphere of construction and the national economy as a whole must by necessity become "high-speed." No other reasonable alternative to this can be expected.

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CONSTRUCTION PLANNING AND ECONOMICS

CONSTRUCTION OFFICIALS DISCUSS INDUSTRY'S PROBLEMS

Deputy Minister Outlines Problems

Moscow SOVETSKAYA ROSSIYA in Russian 5 Jul 83 p 2

[Interview with A. M. Yakovlev, deputy minister, USSR Ministry of Construction by I. Vorontsov, engineer: "Why Firms do not Guarantee", date and place not specified]

[Text] The July Plenum of the CPSU Central Committee examined key problems of the national economy. Comrade Yu. V. Andropov stressed that an improvement in production relations also requires a radical improvement in planning and management. Specialists in capital construction, one of the national economy's largest sectors, are searching for optimal management structures.

[Question] How would you evaluate the situation in capital construction and what is your opinion on management structure?

[Answer] The stubborn facts speak for themselves. Judging from the situation they are against us builders. We often miss deadlines for the operational introduction of enterprises and facilities. There are frequently complaints about work quality. We are criticized and fined, while things improve slowly. It is difficult to find a manager today who would guarantee a project's delivery within the set deadline. What are the reasons for seeing one of the most important sectors of the economy among the lagging ones?

There are many reasons here, but the main one, I think, lies in the existing system of construction management. I will give my opinion about this system, above all the lower and middle elements. These are the closest to the work and increased capital investment efficiency depends upon them.

Practical experience shows that the number of lower level construction units is rapidly rising today while their completed work volume is declining or remaining at levels reached five years ago. Why is this happening? Let us analyze the evolution of the primary management element and those aspects of it which have a negative influence upon production. Construction trusts and equivalent units have been in existence for several decades. During these years they have experienced great changes. A former trust with an annual work volume of 20-30 million rubles was distinguished from a contemporary one by its completeness and its independent solution to many production and economic problems. In addition to

construction subdivisions, it also had various specialized units. It had on its balance sheets brick and ferroconcrete plants, quarries, machine shops, sawmills and woodworking shops, and various kinds of equipment.

This gave it a great deal of independence. It could build practically any project on its own. From the central departments trust managers solved a small circle of problems, mainly of a long-term nature. Its shortcomings, however, the low technological level and the correspondingly low labor productivity and high work prime costs, sometimes completely negated these positive features. Therefore annual output per worker at such trusts did not exceed 3,000 - 5,000 rubles. Wages were also low.

Rapid economic growth rates and the sharply rising technical standards of projects being built forced an acceleration of industrialization, an increased level of prefabrication and intensified specialization in the sector. As time went on specialized units began to conduct up to 60 percent of contracted work. This led to a sharp increase in the number of subcontractors. For example, there were up to 40 such units at the construction of some facilities at the Kama Truck Plant and the Novolipetsk and Cherepovets Metallurgical Plants.

Just what has happened to trusts? They had many other features. In order to carry out the same amount of work it became sufficient for them to have 2,000 - 2,500 people. Annual output per person increased to 8,000 - 12,000 rubles. Quality improved incomparably and work rates increased. However, they also lost much. Materials, structural elements, construction machinery and truck transportation are obtained from the outside. In particular they were deprived of independence in the solution of most problems. As has already been stated, sometimes up to 60 percent of the work is performed by so-called subcontractors.

[Question] Yes, and under such conditions, trust workers apparently turn more frequently to main administrations and the ministry in order to more rapidly and fundamentally solve material-technical supply and other urgent problems. Is this not the case?

[Answer] Yes it's true. Instead of working on long-term problems in construction management, specialists at the ministry's central apparatus must be involved in current operations. This, and the remoteness from construction sites prevent the operational solution to a huge number of problems arising on the spot and hinder control over the implementation of decisions.

From everything said one can conclude that construction management structure has lagged behind technical progress and has become a significant brake upon it.

[Question] At one time such a disease affected industry.

[Answer] Yes, but there an effective cure was found: the creation of production and scientific-production associations with closed economic cycles. Years of experience on the part of giants such as AvtoZIL, AvtoVAZ and others are convincing proof of the efficiency of such management structures. Today therefore one can confidently assert that the association of enterprises, not only from the same, but also from adjacent sectors and the creation of long-term economic ties between them is the proper way to improve the national economy's management. This line is being put into effect by our party.

[Question] The question arises as to whether such associations can be created in construction.

[Answer] They unconditionally can. However, it must be kept in mind that construction has its own specific features and it would not be correct to mechanically transfer here the structure which has been established in industry. We have acquired some practical experience. For example, the Vinnitsa method of non-trust construction management is widely known. Kaliningrad builders have also changed to this form. Frankly, many managers are somewhat afraid of this, and I am too. How can one turn away from trusts, which have existed for many decades?

How about the Kaliningrad Production Construction-Installation Association? Depending upon the availability of labor resources and production base capacity it is capable of completing a 50-60 million ruble annual work program. It includes industrial enterprises, truck transport and construction equipment, as well as residential-communal facility operations. In other words the association's structure is similar to the former trust, which had a high level of independence in solving production and economic problems.

This, so to say, is an organization of a territorial nature, but specialized directions can also be formed. For example, Yaroslavl builders suggested creating an association for residential-civil engineering construction with a work volume exceeding 50 million rubles annually based upon two house building combines and the Yargorzhilstroy [Yaroslavl Residential Construction] Trust. However, this is still an insignificant experiment as nobody has as yet applied it. In particular, our science has still not made any proposals, and urban construction specialists have restricted themselves to publishing directives on the procedure for developing general management schemes. These do not even define the fundamental problems of structural improvements for all management elements.

As an experiment, some specialists propose combining, for example, the trusts building chemical projects into a Khimstroy [Chemicals construction] union firm. In addition, the complexity of this sector's production technology and of its construction projects require the retention of qualified key personnel, permanent direct ties with services of clients and enterprises manufacturing process equipment and with subcontracting organizations. This would probably be easier to attain in a large specialized unit. Such conditions would obviously improve the technology and accelerate project construction as well as upgrade economic and qualitative indicators.

Such units could also be created for the construction of projects in ferrous metallurgy, related enterprises in machine building and agriculture. It appears that it is advisable to include planning organizations on their staffs. I repeat, however, that specialists assert the final conclusions on this problem require an experiment. This would be a serious, scientifically based experiment which would show the optimal parameters of such a formation, the basic requirements made upon it, and which would have subsidies for its workers. However, when it comes to this last item, everybody who encounters experiments throws up their hands.

Here is why. In order to receive a subsidy, builders must turn to the USSR Ministry of Finance. This is proper, for who, if not they, should look after the economical expenditure of state resources. There are thus no objections against this procedure. However, it is difficult to agree with the established practice, which finance officials have summarized in a special saying: "Turn it down -- don't make a mistake" ["Otkazhi - ne oshibesh'sya"]. They do turn them down, not thinking for a minute that the management workers coming to finance organs are also guided by state interests.

[Question] What is your view on the problem of improving the territorial organs of construction management?

[Answer] Experience shows that the majority of managers now agree that the territorial principle of management should be considered the most effective for capital construction. Only within the boundaries of a single territorial organization is it advisable to have specialized units such as those discussed previously.

Practice has also shown that in construction the three element system -- union ministry, republic ministry (territorial glavka [main administration], administration), and trust -- has justified itself. Construction-installation trusts and equivalent organizations are the main, primary element, given the rights of socialist state enterprises. Trusts should also be created mainly on regional principles.

Today, due to the removal of industrial enterprises, transportation organizations and mechanization services from the contemporary trust, all contractors have become outsiders. The trust apparatus has gradually become engaged in the very same questions which were previously under the jurisdiction of lower subdivision apparatuses: labor and production organization and coordinating work with other units. This has led to many trusts centralizing the functions of their administrations for planning-production, financial, personnel and other problems. They have practically become the primary elements of management, with the rights of socialist state enterprises, leaving construction-installation administrations only production functions -- the rights of shops. Thus, lower subdivisions are dying out as independent management elements.

Yet another important problem arises here -- lower elements' loss of independence. Having been deprived of it, construction-installations and equivalent units are beginning to be accountable only to trusts, and not to the state, as previously. However, they do not produce accessory items like shops at an industrial enterprise, for example, but finished projects. In addition, our intra-trust cost accounting is still not perfected. Therefore lower level collectives are gradually losing responsibility for the operational delivery of shops and enterprises.

The consolidation of lower element units is not, as they say, playing the last role. The situation is also made more complex by vicious tendencies of localism. Every rayon or city, without fail, wants to have its own construction organization, regardless of its work volume. Our ministry published an order which required that territorial main administrations and republic ministries

present their proposals on management structure improvements, having agreed upon them with local party and soviet organs. There are almost no suggestions on consolidating contracting organizations in the material which has arrived. At the insistence of local organs, the majority of territorial units are soliciting for the creation of new trusts, administrations and mobile, mechanized columns. This turns into sort of a game. The ministry argues that small organizations are unprofitable, resulting in sizable losses, while local party and soviet organs seek ways to increase the volume of completed work not by increasing the capacity of existing units, but by increasing their number.

[Question] Doesn't this promote the growth of the in-house [khozyaystvennyj] method of construction?

[Answer] It undoubtedly does. The in-house method is in principle essential, but, as they say, within rational limits. What is really happening here? Here in an example from Ivanovo Oblast. The RSFSR Ministry of the Textile Industry has 13 mobile, mechanized columns here, at which about 4,000 people are working. There are 10,500 people working under the in-house method in the oblast, while concurrently, Glavivanovostroy [Main Ivanovo Construction Admin.] has about the same amount.

It is commonly known that the in-house construction method has considerably lower work intensity, lower levels of industrial methods and consequently, lower output. However, by various means workers in such organizations are paid considerably more than in contracting units. For some reason this has not come into controlling organs' field of view. This is why there is a mass exit of people from contracting collectives.

For these reasons there has, in recent years, been a sharp slowdown in the growth of completed work at the ministry. The question arises as to whether or not we are using labor resources too wastefully in construction, promoting the excessive development of the less efficient in-house method of conducting work. After all, this question also directly concerns management structure.

I want to especially stress that the improvement of capital construction management structure is now a very important state task. For the sake of fairness I will say that in reality we are only slightly engaged in this, showing a little shyness. The problem is very acute. We need construction firms which in cooperation with partners would guarantee the national economy the observation of deadlines for the introduction of high quality projects. Only such firms and such guarantees will permit reducing incomPLETED construction to normed limits, sharply increase the efficiency with which capital outlays are used and the return on each public ruble invested in the development of the nation's economy.

Installation and Special Construction Work Surveyed

Moscow STROITEL'NAYA GAZETA in Russian 22 Jul 83 p 2

[Article by K. Lipodat, deputy minister, USSR Ministry of Installation and Special Construction Work: "The Orientation -- High Output"]

[Text] Obviously, the present technical level of installation operations was not reached right away. Some areas, such as large block installation took shape gradually and received widespread application only as a result of great achievements by Soviet machine building, welding and other technology. The active introduction of many progressive discoveries of science and technology (lasers, X-ray examination and others) into installation practice decisively changed the nature of projects and installation work techniques.

We have made a large step forward in the installation of metal structures, manufacturing process, electrical engineering, sanitary engineering and automatic equipment. Industrial electrical engineering facilities and control centers, general purpose modular electric substations and completely modular insulated structures have found wide use at our sites. Structure and equipment assembly methods have undergone radical changes. Hundreds of thousands of installation workers have been taught new methods. There have also been great transformations in the technology of special construction work, such as "wall in the ground", canal digging by controlled explosions, smokestacks made out of ferroconcrete rather than bricks, the high speed driving of tunnels, and others.

In the final account all this permits us to annually complete a growing amount of work without increasing the number of workers. It is attained through growing labor productivity alone.

The manufacture of metal structures has been organized at the ministry's plants. These include light weight structures, parts and assemblies of pipelines, intermediate products and structures for electrical installation, sanitary engineering, and ventilation work and structures and parts for insulation. The ministry's industrial enterprises and production bases are served by hundreds of mechanized and automated lines.

A solid production support system has permitted us to actively introduce the large block installation of structures and process equipment. A lot of work has been done in this area. Together with machine building ministries we have developed standards and technical conditions for the manufacture and delivery of equipment with a high degree of in-plant fabrication. They serve as the basis for contracts with numerous planning institutes at client ministries covering the inclusion of our requirements ensuring the introduction of industrial methods at enterprises under construction. All this in the final account has made it possible for us to annually install about one million tons of manufacturing process equipment in large blocks, introduce a conveyor method for the installation of roofing and sharply reduce the labor intensity of many other types of installation and special construction work.

Concurrently, we still have much potential for further growth in installation work industrialization and mechanization. It is no secret that 34.5 percent of the work at our projects is still carried out by hand. In order to sharply reduce this it is essential first of all to mechanize such massive operations as the anticorrosion coating of metal structures and the installation of insulation, which to a considerable degree are done manually. Science knows how to do this. However it requires the active assistance of ministries, which should supply installers with the appropriate equipment.

Another reserve is the further application of already developed industrial methods. I have already mentioned that we have attained the one million mark in the volume of large block installation of process equipment. We really, however, install much more, as a lot of it is still assembled from parts arriving at our projects "in a heap". We have now planned to increase the volume of equipment installation with increased degrees of in-plant fabrication to 75 percent, more than doubling our present level. We can't, however, handle this by ourselves. It is obvious that USSR Gosplan, the USSR State Committee on Science and Technology and the USSR Gostroy [State Committee for Construction Affairs] should finally approve a comprehensive applied scientific-technical program to increase the in-plant and installation fabrication of manufacturing equipment.

The conveyor method of roofing application has fully shown its high effectiveness. Nevertheless it still accounts for only five percent of all such work at industrial projects. Here is a truly huge reserve. Design institutes at client ministries must more boldly and decisively use the block installation of roofing in their plans. This would accelerate installation somewhat, free thousands of people from manual labor and reduce accidents.

Practice shows the high efficiency of using three layer protective structures and shaped steel sheets with economical heaters. However, the further introduction of such structures depends completely upon the USSR Ministry of Ferrous Metallurgy, which still limits our deliveries to galvanized steel sheets.

The level of installation mechanization and industrialization could be considerably increased if USSR Gosstroy would take more energetic measures to further standardize and unify planning decisions of enterprises under construction, metal structures and engineering equipment of buildings and facilities; if the USSR Ministry of Ferrous Metallurgy, the USSR Ministry of the Chemical Industry and the USSR Ministry of the Construction Materials Industry would considerably expand the production of new, effective materials for construction and if the Minstroydormash [Ministry of Construction, Road and Municipal Machine Building] would finally really organize the production of modern machinewy and equipment.

The further growth in installation operation technical standards is a complex task. Its solution is only possible if there is a concerned attitude on the part of our partners -- industrial sector ministries and state committees.

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CONSTRUCTION PLANNING AND ECONOMICS

GOSPLAN OFFICIAL ON 'DISORDER' IN CONSTRUCTION INDUSTRY

Moscow PRAVDA in Russian 7 Sep 83 p 2

[Article by Professor S. Bulgakov, chief developmental director for the USSR Gosplan Unified System for Planning of Capital Construction: "It Begins With the Plan -- Strengthening Order in Production"]

[Text] Introducing order into capital construction was noted at the November (1982) Plenum of the CPSU Central Committee as one of the central national economic problems. Its successful solution depends on all the segments of the economic mechanism, and primarily on the quality of planning.

In everyday life, the notion of disorder at the construction site is associated with cluttered work area, breakage of materials and constructions, work alterations, and low quality of erected units. This is evident, so to speak, to the naked eye. Poor organization of building production and indecisive management of the work on the part of the ministry and trust apparatus is less apparent. It is often felt that it is enough to raise the quality of management at these levels, and the sector will begin to work well.

This is not entirely true. There are also disorders of a "third level." In the opinion of a number of specialists, the effectiveness of capital construction projects depends to a large degree on the quality of the plan and project design decisions.

In these September days the campaign on plan formulation for the coming year has reached a climax. There are many "outsiders" in the gosplan offices. Managers of all ranks are "lobbying" for capital investments and volumes of construction-installation work. There has never yet been a case where someone said that he had been allocated excess funds. On the contrary, everyone is asking for more.

The builders, being unable to perform all the work proposed to them, take the opposite position -- fewer construction sites, less volume. The arbitrator in disputes is the USSR Gosplan. However, in settling them the Gosplan specialists necessarily reduce the attention given to their main task -- the formulation of balanced plans for the proportional development of sectors of the national economy.

The fact is that only a part of the plan decisions are being questioned. A significant portion of the fulfilled limits of capital investments and construction-installation work is coordinated by the consumer ministries with the contractor ministries without disagreement. However, they do not always allocate the funds by year in accordance with the standards for erecting the facilities. Often less important construction projects are included in the plan (as long as there are the construction subsections to do them!), leaving on starvation rations the capacities of much greater significance which are being erected in other regions.

In general, trust directors have stopped resisting the inclusion of more and more new projects into the plan as soon as their program exceeds the previously attained level by four or five percent. After all, it doesn't matter, they think, since the plans are now unrealistic anyway. Now they are beginning to work toward another end. Their reaction in answer to the incomplete balance in assignments is the desire to give "bulk" at whatever cost, which still directly determines the wage fund of the collectives. This leads to the growth of unfinished construction, the dispersion of forces, and the absence of direct economic interest in reducing estimated cost of work and in the application of inexpensive materials and constructions.

The plan, according to the definition of V. I. Lenin, is the accumulated will of the workers. It plays the role of a strong mobilizing force, providing organization, strict order, and rhythmic nature of production. However, this is true only under the condition that the plan is scientifically substantiated and realistic. If it is compiled without comprehensive development, then it becomes the antithesis.

However, there are still many miscalculations in planning. The number of simultaneously implemented building projects today significantly exceeds the resource capacities. According to the data of the USSR Central Statistical Administration, the remainder of estimated cost for started projects is equal to 4.9 percent of the annual plan. In other words, it would take 5 years to complete the present construction projects, and that is without starting new ones. However, the average standard duration for erecting them is 2.7 years.

We get the impression that capital construction work is not being sufficiently managed in a centralized order. As a general explanation, this is usually blamed on departmental and localized interests. Undoubtedly this does occur. The gratis receipt of capital investments by ministries and departments inevitably causes increased demands for the construction of new facilities with the incomplete utilization of existing capacities. We also make a large number of decisions which are necessary in principle regarding the development of individual sectors or the output of certain types of products. However, we do not give enough consideration to the fact that the decisions made earlier on the construction of other enterprises in the same rayons have not yet been realized.

How can we bring order to planning? For this it is necessary first of all to have before us a picture of all or at least the most important construction projects, in the country as a whole as well as by individual region. However,

today the planning organs do not have complete information in this regard at their disposal. Therefore, in order to cardinally improve construction planning in the present 360 sectors and sub-sectors, it is necessary to create a singular system of storing and processing data on construction projects with the broad utilization of economic-mathematical methods. Secondly, it is necessary to overcome the organizational dispersion in making plan decisions in the sphere of project design, distribution of capital investment limits and construction-installation work, and allocation of material-technical resources.

A year-and-a-half ago the USSR Gosplan adopted the decision to create the Unified System of Planning Capital Construction (USPCC). Its foundation is a unified information base for all levels of management (from the enterprise and the construction site to the Gosplan), as well as unified methodological, technical, mathematical and legal principles.

This requires some clarification. Today in the country around 26,000 construction sites of production function are being simultaneously erected. Their greatest portion -- 18,000 -- are sites costing under three million rubles each. If we add them up, we will get less than five percent of the overall estimated cost of production facilities. The remaining 95 percent of the volume of capital investments are directed toward the creation of capacities costing more than three million rubles each. Control over all the facilities is complex. However, control over 8,000 sites, which are essentially the determinant ones for the development of the country's industrial potential, is fully feasible with modern computer technology. It is these which are to be included in the country-wide unified system of planning capital construction.

The list of such construction projects may be expanded at the ministry level.

The information card filled out for each construction project contains all the project, standard and itemized indicators necessary for plan development. The information contained on the cards is fed into a computer memory. Also stored there in a separate body are the data on the capacities and work-load of all 3,100 construction-installation trusts. In the course of the work, as well as with changes in the project indicators, the information is systematically updated.

Such a system would allow the Gosplan, Gosstroy, Gossnab, Stroybank and USSR Central Statistical Administration, as well as the ministries and departments, Soviets of Ministers of the Union republics, glavstroy, associations, enterprises and trusts to quickly obtain data on each overdrawn building site. It would also be no trouble to place on the director's desk at any level of management the generalized information on the total number of facilities in one sector, on the group of building sites relating to a certain territorial-industrial complex or goal-oriented complex program.

In short, with the aid of the Unified System it is possible to go from talk about greater coordination of plans in the sectorial and territorial segments with the capacities of the trusts to a practical resolution of this problem.

The planning workers will have the ability to establish the volumes of capital investments and contract work not "by base", but by computation of actual need for them -- the amount necessary for the operational introduction of capacities and facilities and for maintaining work done in anticipation of the standard level. The Gosplan will obtain effective levers for concentrating monetary means and resources at construction sites having primary national economic significance.

The Unified System will also provide Stroybank and Gosstroy specialists with the necessary information, and they will have a more active influence on the quality of plans in the course of their development, and not merely analyze critically the already ratified programs, as is the case at the present time. The Gossnab workers will finally be able to allocate material resources for construction projects according to actual need determined on the basis of project designs and estimates. This will significantly improve the situation in construction. After all, the present practice of determining needs on the basis of representative facilities and the plan structure for the preceding year is imprecise and irrational.

Along with the performance of plan functions, the Unified System of Planning would allow the USSR Gosplan to implement -- and this is principally important -- effective control over the realization of plan assignments. At any moment it would be possible to find out the state of construction, the actual amounts of remaining equipment and materials, and the presence of work forces. Naturally, this would facilitate an active reduction in unfinished construction on the whole and for each contractor and to maintain standards of work completion.

At present, the Unified System of Planning Capital Construction is being intensively created. The construction site cards have been filled out for most ministries and departments. Experimental computations have been conducted using the example of Mintyazhmash [Ministry of Heavy and Transport Machine Building] and Minkhimmash [Ministry of Chemical and Petroleum Machine Building] facilities, which have confirmed the correctness of the chosen method. Methodologies are being prepared for the solution of balance problems, as well as standard plans for the creation of a unified system of planning at the republic, sectorial and territorial levels.

The problem of standardizing capital construction in the country requires the joint efforts of numerous organs. This is why it is expedient, as provided in a recent resolution by the CPSU Central Committee and the USSR Council of Ministers regarding the acceleration of scientific-technical progress in the national economy, to formulate a temporary-subsection of intersectorial character comprised of specialists from Gosplan and Gosstroy, the ministries and departments, and their economic institutes. This collective should be charged with solving the target problem--to finish creating the Unified System by the start of formulation of the plan for the 12th Five-Year Plan period.

Of course, this system is but one of many factors in the comprehensive improvement of capital construction. Without it, however, it will be difficult to establish order in the branch and to accelerate the start-up of production capacities.

CONSTRUCTION PLANNING AND ECONOMICS

SCHOOL CONSTRUCTION LAG IN SOME UNION REPUBLICS REVEALED

Moscow UCHITEL'SKAYA GAZETA in Russian 16 Jul 83 p 1

[Unattributed article: "That New Buildings May be Ready"]

[Text] Preparation for the new school year is in full swing. Not so much time will pass, and millions of Soviet students will again be meeting with their teachers. For hundreds of thousands of children and their preceptors, this day will be a double holiday: they will come to new buildings and fill bright, spacious classrooms and offices.

Newly erected projects at the Tselinnyy sovkhoz in the Yasnenskiy Rayon of Orenburg Oblast and in the new Ozerki-Shuvalovo microrayon of the city of Leningrad are already prepared to convey such a joy today, as are many others planned to start in the current year. The construction plans in the Mordovian and the Chechen-Ingush ASSR's and Vologda and Kursk Oblasts are being fulfilled and overfulfilled. The schools in the city of Moscow are traditionally built in exactly the specified span of time. The constant, intent attention of the Moscow City CPSU Committee and the Moscow soviet ispolkom to school affairs rules out failures in construction schedules and in the starting of educational facilities.

As is well-known, the fate of any plan depends on the abilities and the resolution of the people actively carrying it out and doing everything necessary for the realization of what is intended. In the RSFSR Ministry of Education, for example, a staff has been established for the supervision and operational assistance of construction projects. Here reports from projects under way are regularly discussed. Responsible officials--representatives of the ministries and departments carrying out the basic volume of work on school construction projects in the republic--participate in the meetings. Such supervision and timely taking of measures in the remaining sectors speaks well of the state of school construction in the RSFSR as a whole.

As a rule, the floors of schools are growing at the prescribed pace in Belorussia, Lithuania, Georgia, and a number of other republics. But this is unfortunately far from being the case everywhere. As was recently noted at a meeting of the collegium of the USSR Ministry of Education, the situation regarding the construction of schools in the country is at present

unsatisfactory. The yearly limit of capital investments allocated for these purposes is only one-third expended. Work on construction projects under way in the Uzbek, Kazakh, Moldavian, Latvian, Kirghiz, Tajik, and Turkmen union republics is intolerably slow. The construction of a considerable number of school buildings near organizations subordinate to union ministries--the Ministry of Power and Electrification; the Ministry of Petroleum Industry; the Ministry of Gas Industry; the Ministry of Timber, Pulp and Paper, and Wood Processing Industry; the Ministry of Food Industry; the Ministry of Fruit and Vegetable Industry; and others--is being held in check.

For what reasons? They are the previous ones. Bad organization of the business: a low technological level of construction; dissipation of labor, material-technological and financial resources; tardy opening of financing and concluding of contract agreements; and lack of plan-estimated documentation and equipment. To this can also be related the worthless planning practice of deploying the basic labor front in the second half-year in spite of the need to deliver new schools by September. How otherwise to explain that, for example, a total of nine percent of the yearly limit of capital investments for the construction of general-educational schools had been expended in May.

The most expeditious and effective measures must now be taken without delay in order to make up for what has been missed as much as possible. It is necessary to hold those who permit an irresponsible attitude toward the building of educational projects strictly responsible. Every construction project under way should be subject to special supervision: this is the direct responsibility of the ministries of education of the union republics; the local organs of popular education; and the republic, kray and oblast committees of our trade union. It is important to make use in full measure of all production possibilities, construction technology and materials, to gradually increase the work pace from day to day.

In the present stage of school construction, the qualitative aspect acquires more and more importance on a level with the quantitative. It is not just that there should be more new schools. It is also necessary that they be better built, more durable, on a level with the present achievements of the construction industry. And it is the more annoying that there are numerous cases in which newly-erected schools have been delivered for use with major imperfections.

Here is a letter from among those received by UCHITEL' SKAYA GAZETA in recent days. In the village of Laish in Akdarinskiy Rayon of the Uzbek SSR, Middle School No 45 was delivered for use in a literally unfinished state. Here is a picture of these apologies for imperfections. "The floors on the first story and in the gymnasium have collapsed, the roof leaks, the heating system doesn't work.... We await the winter with fear," write the letter's authors, the directors of the school and of public organizations. "Last year the children sat in their lessons in overcoats and shawls. The health and epidemic station closed the school because of the low temperature in the building." Do they know about such a situation in the rayon courts? Yes, they know, but measures have not yet been taken. It is impossible to reconcile oneself to such a situation any longer, just as it is impossible to leave the waste permitted by the builders unpunished.

Imperfections should be eliminated from school construction projects immediately, but the main thing is not to allow schools to be accepted with them. Strict supervision of quality should be established everywhere. Educators do not have the right to make compromises, to yield to threats and pressure from contract organizations that sometimes try to deliver construction projects with the help of various kinds of protestations.

The broad development of socialist competition is an important stimulus for construction collectives. Given good organization, it furthers the most complete development of social initiative and a rise of labor activity. In the crucial period of preparation for the new school year, we must also make maximum use of the local press, radio and television to discuss more fully and broadly the obligations undertaken and how they are being realized.

In the present year, we are going to put school buildings into service in hundreds of thousands of places. We can correct the alarming situation at the construction sites only with the help of the collective, energetic, and efficient actions of all those interested in the success of the matter. First and foremost, we need a business-like coordination of the activities of the ministries of education of the union republics and the republic trade-union committees with clients and with organizations of the contracting construction ministries.

At a meeting of the USSR Council of Ministers held the other day, it was emphasized that the construction ministries and Councils of Ministers of the union republics should concentrate their maximum strength and means on ensuring the fulfillment of tasks connected with bringing into service production capabilities and also residential buildings and projects of a cultural nature.

All new school buildings should be ready on time! Without losing a day or an hour, we should take the most active measures that will permit pupils and their preceptors to begin their lessons on September 1 in auspicious conditions.

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CONSTRUCTION PLANNING AND ECONOMICS

BRIEFS

CAPITAL CONSTRUCTION MEETING--An expanded meeting on questions of capital construction was held at the headquarters of the Turkmenistan Communist Party Central Committee on 10 October. Participating in it were representatives of the party and soviet organs, leaders of the ministries and departments, directors of the trust enterprises, and responsible workers of the Turkmenistan Communist Party Central Committee, the Council of Ministers and the Turkmen SSR State Planning Committee. The results of capital construction in the republic during the past 9 months of this year and the progress of constructing the major industrial projects were discussed. It was noted that although some progress was achieved in comparison with last year the rate of construction and exploitation of houses and projects of social and cultural significance in Ashkhabad, Mary, and Tashauz oblasts is still not progressing as planned. Progressive labor methods are being introduced weekly. The party and soviet organs, the leaders of the ministries and departments, clients, and contractors are required to accelerate the rates of constructing houses and projects of social, cultural, and industrial significance in such a way that the tasks of the third year of the 5-year plan period can be absolutely fulfilled. The meeting was addressed by V.F. Dzulenev, secretary of the Turkmenistan Communist Party Central Committee. The meeting was attended by V. I. Abramov and V. V. Vershinin, deputy chairmen of the Turkmen SSR Council of Ministers. [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 12 Oct 83 p 2]

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INDUSTRIAL CONSTRUCTION

INDUSTRIAL CONSTRUCTION MINISTER REVIEWS STATE OF AFFAIRS

Moscow STROITEL'NAYA GAZETA in Russian 12 Aug 83 p 1

[Article by A. Tokarev, USSR minister of Industrial Construction: "Learn to Economize"]

[Text] August 14 is the Day of the Builder. All Soviet people observe this holiday together with the industry's army of more than 10 million toilers.

Capital construction is one of the central sectors of the country's national economy. And construction workers have something to be proud of. Every year some 20 new towns, each with an integrally planned structure, completely provided with engineering economy and public services and amenities appear on the map of our country. Some 11 million people celebrate housewarmings each year. In this regard, more than 60 percent of the country's housing construction is built at state expense for allocation of apartments to workers free of charge. Comfortable city-type settlements are transforming our villages.

The builders are working on the tasks of the 11th Five-Year Plan with enthusiasm. They are also approaching their professional holiday with brilliant triumphs in their work. In the first half of 1983, they have assimilated fixed capital valued at more than 36 billion rubles. This is 2.9 billion rubles more than in the first half of last year. The volume of contract work has risen by four percent, and commodity production by eight percent.

The Tobol'sk TETs and the turbines at the Ekibastuz GRES-1 have gone on line as well as capacities of the cuts at the Tyul'ganskiy coalfield in Orenburg Oblast and the Nazarovskiy coalfield in Krasnoyarsk Kray, production of mineral fertilizers has begun at the Novosolikamsk potassium combine, of polyethylene at the Kazan' Organic Synthesis Production Association, of cement at the Savinsk plant in Arkhangel'sk Oblast. The Urengoy-Pomary-Uzhgorod section of the gas pipeline, 1600 kilometers in length, went on line ahead of schedule. We are building the BAM successfully, we are realizing the country's Food Program, and we are transforming the Nonchernozem.

Much has been done and is being done. But to date there have been not a few slips and foul-ups in the branch's work.

The economic mechanism still functions haphazardly in the decisive stages of production, both directly at the construction sites and in interactions with partner-clients, with designers, and with planning, supply and financial organs. Losses due to unsatisfactory organization of production constitute almost 70 percent of all losses of working time.

In speaking at the June 1983 Plenum of the Party's Central Committee, Comrade Yu. V. Andropov stressed that "... assuring the well-adjusted, regular working of the entire economic mechanism is the necessity of today and the program task of the future."

Now we need a new approach in principle to the distribution of capital investment and the organization of construction. Capital investments should be employed more efficiently. The coordination of common actions should essentially be better organized.

Without question, with the transfer to planning and calculations in commodity production, the builders have received a powerful impulse in this direction. Things are being put in order in the branch. The level of concentration of resources on construction starts has risen. This, in particular, has allowed the USSR Ministry of Industrial Construction to exceed the construction starts program for the half-year.

To a considerable extent, long-term special-purpose programs are improving the management mechanism. Twelve such programs are now functioning in the USSR Ministry of Industrial Construction. Special-purpose program planning permits the comprehensive resolution of many central problems of construction. We are also obtaining good results from the introduction of the system of industrial long-term flow-line construction--SILFC.

We are building very important projects for the light, food, meat, and dairy industries of the Nonchernozem in flow-line fashion. Construction is switching over to flow lines according to types of production. The questions of establishing a progressive production base for construction and of improving the planned-volume resolutions of building and complexes, the technology of an enterprise, and the construction process itself are being systematically solved. The general contracting ministry is organizing such flow lines in cooperation with client ministries and the USSR Ministry of Installation and Special Construction Work.

Prior to the establishment of SILFC, the level of complete prefabrication was 20 percent at petrochemical and petroleum refining facilities. At the start of this five-year plan, it exceeded 60 percent. On projects of an agricultural purpose, it is still more appreciable: a three-fold or four-fold increase. A catalog of standardized, simplified constructions for new building projects in the Nonchernozem has been compiled.

The flow-line construction of 25 meat and dairy industry projects alone allows us to save 2200 tons of metal and 3700 tons of cement, and to cut labor expenditures by 170,000 man-days.

The central method of construction is opening new possibilities for establishing flow-line production. The building of facilities for the Odessa port and the Nikolayev alumina plants by this method has brought great success. In connection with this, it appears that it would be expedient for USSR Gosstroy to oblige its subordinate design institutes and the institutes of client ministries to carry out the planning of projects on the basis of the central method of planning, organizing and administering construction.

Preparation of organizations for the transfer to planning the productivity of labor in accordance with normative standard not [normativnaya uslovnochis-taya] production--NSP--is being carried out. The industrial enterprises of the ministry are already working in accordance with the new index. Unfortunately, the matter has been slowed down in the construction collectives, inasmuch as the planning organizations are not hastening to transfer their calculations. It appears that they must be speeded up.

The transfer to commodity planning prompts changes in the system of organizing the plan. In the client ministry's plan, the means for the introduction of power and for the stage of work in progress should be clearly demarcated. In this respect, it is also expedient to organize the planned adjusting of incomplete production by oblasts, krays, and republics.

The old order of formalizing the share participation of clients does not agree with the commodity plan. For the years 1983-1985, the question of including in the plan construction projects with a volume of work almost 15 percent of those presented for consideration has remained open in connection with a lack of share means. A centralized procedure of share transfer should be established.

In a resolution of the CPSU Central Committee and the USSR Council of Ministers on improving the economic mechanism, it states that if a construction project is not provided with documentation prior to July 1 of the year preceding the one planned for, it cannot be included in the plan. But they are included. And what comes of such doings? Because of the inopportune providing of documentation and equipment for construction projects, about half of the projects are not begun, and we will deliver them with delays. And the arrhythmia of starting? For example, in 1983, of the 280 new projects in the national economic plan, it was planned to start one in the first quarter, 36 in the second, 38 in the third, and then 205 projects in the fourth--almost three-quarters of the construction program.

Clients often underestimate the true value of start-up complexes. Builders handling their tasks successfully cannot deliver them for operation. There were 18 such construction projects last year. Among them were the Savinsk cement plant, the Yefremovsk chemical plant, and the capacity for production of diethylhexanol at the Perm petroleum organic synthesis production association.... In order to start them, it is necessary to perform additional work valued at 30 million rubles.

In the current five-year plan, the USSR Ministry of Industrial Construction has planned to bring the level of carrying out work by brigade contract to

60 percent of the total volume of contract work in construction, or to 45 percent in industrial construction, to 85 percent in residential and socio-cultural construction, and 65 percent in agricultural construction respectively. The savings in the calculated value of labor is some 200 million rubles.

The matter of transferring the collective to the contract method would have been more successful if there had been no organizational flaws--defects in planning, errors in deliveries, and forced dissipation of strength on numerous projects. In industrial construction, the current procedure for the elaboration of technical documentation is delaying the development of a brigade contract. At the planning stage, the planning organizations do not allocate and do not over-estimate the individual stages and combinations of work which could be transferred to a contract basis. In the course of work, frequent changes in planning-estimate documentation are allowed.

At the frontiers of economic transformations, the country expects active, creative achievements from us all. And first and foremost, as the June 1983 Plenum of the CPSU Central Committee has indicated, we must make use of the experience we have already amassed in every possible way.

In conclusion, I want to warmly congratulate all the branch's workers on their holiday, the Day of the Builder, and to wish for fruitful labor for the good of our beloved Motherland.

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HOUSING CONSTRUCTION

MORE RENOVATION OF OLDER RESIDENTIAL BUILDINGS ADVOCATED

Cost of Repairing Prefabs Compared With New Construction

Moscow STROITEL'NAYA GAZETA in Russian 20 May 83 p 3

[Article by Ye. Blekh, chief, Sector of Economics of Housing, Moszhilniiprojekt; candidate of economic sciences; Ye. Sokova, group leader; and M. Gel'baum, head, Economics Laboratory, Leningrad Scientific Research Institute, Academy of Municipal Services im. I. D. Pamfilov: "Grow To Be A "Five-Story Building"]

Specialists today do not in principle doubt the necessity and feasibility of rebuilding and modernizing housing. Indeed, last year budget allocations for all types of capital repair, reconstruction and modernization comprised approximately 40 percent of the volume of capital investments in housing construction. What is more, the growth rate of this type of work is more rapid than the growth rate of new construction. This is not by chance: it usually costs much less to renovate a residential building than to build a new one.

But all this is true if we speak of some kind of "average" building. It is another matter to rebuild a specific building that has been built according to one of the first standard designs. The debate surrounding the "five-story buildings"--the firstlings of industrial house building--has still not abated. And in general there is something to debate.

The first generation of totally prefabricated buildings that were erected between 1958 and 1965 played an enormous social role. They reinforced the principle of one-family apartments in domestic practice and raised the degee to which the working people were provided with well-appointed housing. However in a short period of time, housing construction went through such significant qualitative changes that housing conditions in the first totally prefabricated buildings can no longer satisfy us.

Modern problems regarding the repair and reconstruction of housing are concentrated in these five-story buildings. Gosgrazhdanstroy [State Committee for Civil Construction and Architecture], Minzhilkomkhoz RSFSR [RSFSR Ministry of Housing and Municipal Services] and Mosgorispolkom [Moscow City Soviet Executive Committee] have directed TsNIIEPzhilishcha [Central Scientific Research and Planning Institute of Standard and Experimental Housing Design], MNIITEP [expansion not given], Moszhilniiprojekt and other scientific and planning institutes to resolve this complex problem posed by the future use of totally prefabricated five-story buildings.

Different variants of reconstruction and modernization of totally prefabricated residential buildings have been examined. The subsequent fate of the "five-story buildings" has been determined as a result of the comparison of technical and economic indicators.

The fate of these buildings varies. Owing to their design features, it is deemed economically unfeasible to rebuild or modernize certain series-- Moscow "K-7," "P-32" and "P-35" buildings and the all-union "OD" and "1 LG-50G" buildings. But these buildings comprise a substantial share of the total inventory of five-story prefabricated housing: approximately 25 percent. It would be premature to tear them down since careful examination of them has revealed that they possess a considerable strength reserve and that they can last a very long time especially if they are repaired in good time.

At the same time, research reveals that the majority of five-story buildings can be rebuilt or modernized. These buildings are in the Moscow series "1-515," "1-510," "1-605-AM," "1-335," and "1-MG-300" and in the all-union series "1-464," "1-463" and "LG-507." What is more, if the structural supports of buildings in series "1-515" and "1-510" are appropriately reinforced, they can be built up to nine stories.

The reconstruction of totally prefabricated buildings includes improving the floor plan of apartments, the more functional zoning of floor space, and the expansion of area allotted for kitchens, entrance halls, toilets and bathrooms. It is also possible to expand the assortment of apartments in accordance with demographic forecasts. It is planned to outfit the buildings with elevators, trash chutes, and automatic control systems, to insulate attic roofs, and to improve the heat insulation and soundproofing of enclosing and interior walls. Such work should be combined with the capital repair of structural elements and engineering equipment in the buildings.

Total one-time outlays and operating costs incurred in maintaining the buildings in appropriate condition in various stages of their normal service life are taken as the criterion for determining the economic effectiveness of housing repair. Calculations show that the total discounted costs of reconstruction and modernization of totally prefabricated buildings grow with increase in service time because the estimated cost of this work increases as a result of the increase in the physical depreciation and obsolescence of the buildings. Therefore the feasibility boundaries of refurbishing the buildings will gradually shrink.

The most significant share in the structure of total discounted costs in the operation of totally prefabricated buildings up to 70-80 years is taken up by the estimated cost of repair and reconstruction work and current operating costs. Beyond this point, the cost of capital repairs increases. The age of the buildings acquires ever greater significance: after all their service life is not unlimited. It should be noted that even though one-time outlays on reconstruction including superstructing plus the modernization of buildings are almost twice as high than for modernization alone, the

level of total discounted costs of rebuilding totally prefabricated buildings is only one percent higher than the total discounted costs of modernization for a period corresponding to 30 years of operation. The reason for this is that a considerable share of the outlays to compensate lost living space resulting from improvements in the floor plan of apartments in totally prefabricated buildings in the modernization process are subsequently compensated in the reconstruction process.

It should also be taken into account that outlays on new construction on sites that become available as a result of the razing of totally prefabricated buildings are substantially higher than on previously undeveloped sites. At the same time, the losses in fixed capital as a result of razing are also high especially if the building amortization period has not expired. The level of these losses is most considerable when the building has been in operation less than 50 years.

Thus, comprehensive investigation of all expenditures in the group of buildings slated for reconstruction and modernization shows that the path of reconstruction in a certain stage is most effective compared with other types of reproduction (modernization, new construction). In particular, reconstruction of totally prefabricated buildings in series "1-515" and "1-510" has been determined to be effective when the buildings have been in operation less than 40 years. Beyond this period, it is advisable to modernize totally prefabricated buildings in these series. Calculations confirm the feasibility of modernizing buildings in this group if they have been in operation less than 90 years. Beyond this point, it is obviously preferable to raze these buildings and to erect new ones in their place.

In the case of totally prefabricated five-story buildings which by virtue of their design, space and floor plan can only be modernized (series "1-605AM," "1-MG-300," and "1-335"), their modernization has been determined to be feasible when they have been in operation less than 90 years. Beyond this time, new construction (combined with the razing of existing totally prefabricated buildings) is the more effective mode of reproduction.

The decision to renovate totally prefabricated buildings through reconstruction or modernization should also take the city designing and building [gradostroitel'-naya] situation into account. If the nature of development in existing microrayons preclude an increase in its density, modernization can be selected as the variant for the given group of buildings.

If we consider that more than 300 million square meters of totally prefabricated buildings were built during the initial years of development of the nation's industrial housebuilding program, it will be totally obvious that this enormous housing inventory cannot be renovated all at the same time.

The strategic directions in the resolution of the given question are as follows. In the first stage, it is deemed expedient to carry out reconstruction in large and very large cities which have very little territory available for construction, thereby making it possible to avoid losses of housing space and to increase the density of urban areas. And considering the

inevitable losses of housing space that result from modernization. it is feasible to carry out modernization in the second stage.

As regards the "five-story buildings" that are not slated for modernization, we suggest that their obsolescence be compensated by increasing the allotment of living space in these buildings over the existing norms. Such an approach will permit the considerable postponement of their premature razing and hence the need to reproduce this part of the housing inventory.

In order to fulfill the vast program of reconstruction and modernization of totally prefabricated housing, it will be necessary to use some of the funds allocated for new construction. Preventive maintenance work should be financed by amortization withholdings. Experimental reconstruction in such major cities as Moscow, Leningrad, Minsk and certain others will facilitate the resolution of the complex of problems associated with the renovation of totally prefabricated buildings.

Quality of Housing Repair Work Questioned

Moscow STROITEL'NAYA GAZETA in Russian 8 Jul 83 p 1

[Article: "The Repair Industry"]

[Text] Our country is steadily and consistently implementing a large-scale social program. Its most important component part is the resolution of the housing problem and providing each family with its own well-appointed apartment.

Each year approximately 10 million Soviet citizens improve their housing conditions. We build more than any other country in the world. But it must also be borne in mind that the existing housing inventory is tens of times greater than the annual volume of new construction. Proper maintenance of buildings presently in operation and high quality repair work prolong their service life and raise the level of amenities and comfort. All this is ultimately directly responsive to the task of totally resolving the housing problem in our country.

At the present time, the state allocates approximately six billion rubles a year for housing maintenance and repair. It is very important that these funds be used most effectively. This is the orientation of the decree of the CPSU Central Committee "On Measures to Secure the Fulfillment of Plans for the Construction of Residential Buildings and Social Facilities." The need to make more complete use of the country's existing potential was also discussed at the June (1983) Plenum of the CPSU Central Committee.

A considerable amount of work has been done to improve the technical maintenance of buildings in Moscow, Leningrad, Minsk, Tallinn, Kishinev, and certain other cities. This work is conducted most consistently and purposefully in Belorussia where the structure of repair and construction organizations is being improved. Repair and construction trusts have been created in each oblast center and the Belremstroy Production Association has been established in the republic's capital city. The level of mechanization of this work approaches the level attained in new construction. As a rule, the brigade contract method is used in the capital repair and reconstruction

of residential and public buildings. The system of continuous two-year planning of repair and construction work is also being successfully introduced in Belorussia.

Moscow's preventive maintenance system is being improved with each passing year. It is also developing an integrated plan for the capital repair of the housing inventory of each rayon and has also compiled a long-range plan up to the year 2000. The volume of repair work performed by specialized trusts in Moscow grows from year to year. Some rayons are already using the group method of capital repair and integrated reconstruction of city blocks. Preparations are being made to improve the modernization of five-story panel buildings that were erected in the initial period of development of industrial housebuilding methods.

However the effectiveness and quality of repair work throughout the nation as a whole do not satisfy modern demands. Funds allocated for capital repair are systematically not used. Annual plan targets [for repair work] are not met in Azerbaijan, Tajikistan, Turkmenia and in a number of cities in the Russian Federation.

STROITEL'NAYA GAZETA receives many letters complaining about the quality of repair work and the unconscionably long time it takes to perform it. In such cases, repair becomes virtually a natural disaster to the tenants: at first, no one knows when it will begin and later no one knows when and how it will end. After all, sometimes even at the beginning of the year neither the client nor the contractor have certain knowledge of which buildings are included in the plan and which buildings are not.

In order to correct the situation more decisively, it is necessary to introduce progressive forms of management of housing and their entire repair industry more persistently and to bring the production capacities of trusts and administrations into line with the projected volume of work.

One of the main reasons behind the nonfulfillment of capital repair plans is the unsatisfactory state of material and technical supply. Several years ago, scientifically substantiated norms for supplying repair and construction work with the necessary materials were drafted and ratified at the appropriate levels. However, every year the resources allocated for this purpose are significantly lower than the quantity specified in the norms. The only about 40 percent of the requirement for dyestuffs is satisfied. The resolution of these problems depends on USSR Gosplan and USSR Gossnab.

There are major differences between the conditions of new construction and the conditions of repair work. This fact notwithstanding, machine builders do not provide repair workers with specialized equipment. What is more, they sometimes do not even have the machines and mechanisms that are produced in series by industry, e. g., cranes with limited carrying capacity. The Ministry of Construction, Road and Municipal Machine Building and supply organs should take steps to correct this situation in the shortest possible time.

Many first-generation five-story buildings are scheduled for capital repair, reconstruction and modernization in the coming quinquennium. The repair of these buildings will require the restructuring of all repair and construction work. Scientific research and planning institutes belonging to Gosgrazhdanstroy [State Committee for Civil Construction and Architecture], gosstroys and ministries of housing and municipal services of union republics will have to develop standard repair and reconstruction plans that would make it possible to use industrial components, semifabricates, blanks and effective materials. The plans should make provision for the introduction of new technological processes and for the use of more sophisticated equipment making it possible to mechanize the work.

When we discuss the restoration and modernization of buildings in the old part of our cities, it is particularly important to see to it that their unique face and our priceless cultural, historical and architectural legacy are left untouched. The experience of Yaroslavl, where the nation's first city designing and building contract (which became the basis of creative cooperation of all participants in urban development) was concluded, can serve as the reference point here.

The renovation of old buildings sometimes demands a special degree of mastery on the part of the renovators. Our country has many such people who are talented masters of their work. It is very important that their experience be passed on to the younger generation. This important task must not be allowed to run its own course. It must be handled on a planned basis. The USSR Ministry of Higher and Secondary Specialized Education and the USSR State Committee for Vocational and Technical Education should long ago have concerned themselves with the training of highly qualified specialists for repair and construction work.

The exemplary maintenance of the housing inventory, the repair of housing on schedule, and the reconstruction and modernization of housing must be regarded as an integral part of our country's social program, the main goal of which is concern for man and for the betterment of his living conditions.

Leningrad's Program for Repairing Old Buildings Detailed

Moscow SOVETSKAYA KUL'TURA in Russian 16 Aug 83 p 3

[Article by F. Razumovskiy, architect: "This Old New House"]

[Text] A stroll around Leningrad is an endless chain of associations and reminiscences with which time has endowed the old streets and quays of this beautiful city.

Erected at the will of Peter "from the dark forests, from the swampy marsh," Petersburg before the revolution was the most "urban" of all Russian cities. The development of Leningrad's historically formed regions of Leningrad today covers 600 city blocks that are the site of 10,000 buildings. No other historical city in our nation--not even Moscow--has as many old buildings. And what an enormous problem it is to preserve the appearance of Leningrad's old buildings and their unique multicolored pastel attire. After all,

the architectural adornment of a city is by no means short-lived. In order that the facades of the buildings lining the city's avenues and quays would provide the "esthetic" comfort that we all need, we must continuously engage in repair work on a vast scale. The complexity of Leningrad's facade decor demands that highly skilled craftsmen.

The way in which Leningrad resolved the problem of repairing historic facades must be carefully studied and widely disseminated. Craftsmen belonging to the Leningrad "Fasadremstroy" Trust work miracles. This specialized organization was created in 1952, at a time when the facades of many buildings still bore the traces of the war. But the only way we can picture the enormous damage that was inflicted on Leningrad by the blockade today is to study photographs in the archives. The facades of Leningrad's buildings have been restored for a long time. The stucco fairy scene of baroque facades, the strict forms of classical structures, the abundant decor of historic styles--neo-renaissance, neo-baroque, neo-Grecian, "Ludwig the 16th style," "Russian" and "Byzantine" styles, and finally brilliantly executed, infinitely inventive modern forms--all this experiences a second birth after passing through the hands of Leningrad master repairmen.

Incidentally, Dmitriy Sergeyevich Zaporozhtsev, the chief engineer of "Fasadremstroy," invariably refers to the trust's craftsmen (who number approximately 2000) as restorers. And he is right to do so. The fact of the matter is that this organization repairs all Leningrad facades. Today the craftsman mounts the scaffolding at the Men'shikovskiy Palace or another architectural monument; tomorrow he will work on the decoration of an ordinary building. One of the main components of success is that there are no objects of secondary importance in the city and that practically the same demands are made on the quality of repair of facades of old buildings.

However this is by no means the only component. Let us take the personnel question as an example. The rhythmic operation of the repair conveyor which works on 150 buildings at the same time (!) depends directly on the skill level and of course on the simple availability of the necessary number of craftsmen. Leningrad repair personnel are trained by vocational-technical training school No 52. It does not only train master builders capable of preserving Leningrad's beauty. Future workers are taught drawing (178 hours a year). There is also a class in esthetics and a shop for modeling architectural and sculptured pieces.

In order that the colors of Leningrad's architectural landscape would not fade, the facades of most buildings must be repaired regularly, every 7-8 years. The city has unique 18th century monuments, the finishing of which has been restored in old materials that must be renovated every year. Such is the range of concerns and scale of activity of the "Fasadremstroy" Trust which in recent years has started working according to the new mainline method. Incidentally, it has already had an appreciable impact on the appearance of Leningrad's central rayons: they have become even more beautiful. After all, the architectural decoration of an entire street is now renewed at the same time. This is how the Nevskiy Prospekt was repaired in 1976 and Voinov and Dzhambul streets were repaired recently.

In many respects, the majority of old buildings in the historically formed regions of Leningrad no longer satisfy the demands that are made on living conditions, i. e., as the specialists say, they are obsolete. The low level of amenities and the rental of individual rooms in large apartments of former income-producing [dokhodnyye] buildings are the major inconveniences that detract from the comfortability of old buildings. However the problems of old buildings are not confined to this. There are numerous questions associated with the physical depreciation of the buildings.

In the 1960's, Leningrad gave birth to the idea of bringing comfort levels in old and new regions of the city closer together. Also born was a new direction in construction--the integrated capital repair of old buildings. For the first time in the nation's history, Leningrad created a system of city services that are directly engaged in this grandiose effort. The reference is to a single client--Lenzhilupravleniye and a single planner--"Lenzhilproyekt" and a single contractor--the Capital Repair Administration (UKR) of the Lengorispolkom [Leningrad City Executive Committee]. Such was the organization of the planned capital repair of historical construction--a real conveyor that can resolve many problems of old buildings all at once.

The essence of the method is that only the main walls plus the street facade remain from the old building--everything else is done over: the internal floor plan, the engineering equipment, the finishing. In the process, there is no damage whatsoever to the external appearance of the city and the city landscape. To the contrary, in special cases the facade of a building is restored to its original appearance was had been lost in the process of subsequent rebuilding. Thus the Voronikhin facades were restored to the building at 27 Nevskiy Prospekt and the famous Katoshikhin house took on the appearance of a house in Pushkin's time.

The capital repair of old buildings has already had a significant social effect in Leningrad. While only 16 percent of the families living in the center of the city lived in separate apartments, this figure is frequently as high as 70 percent in buildings that have been modernized. In former income-producing buildings, it has been possible not only to improve the level of amenities but also to obtain one- and two-room apartments that are in shortest supply today. At the same time, the first floors of buildings which as a rule were occupied by stores, cultural and service institutions were re-outfitted.

The capital repair of one building was gradually extended to a group of adjacent structures and finally to the entire block. Capital repair encompassing the territory of an entire residential block was transformed into reconstruction as part of an urban development program. The elimination of certain negative qualities of the capitalist period of construction and especially the excessive density of development became its basic task. There also emerged the urban development concept of the fundamentally new architectural solution to the problem of the old block which was advanced by a collective of authors at LenNIPgradostroitel'stva.

Let us leave the special problems of capital repair for the time being and resume our stroll around Leningrad. Let us stop, for example, in front of a house that interests us and open the carved oak door at the main entrance. We enter a beautiful entrance hall, walk several paces over the marble tile floor and involuntary halt once again: we see before us glistening varnished panels of fumed oak and stained glass panels. Of course the finishing of the entrance hall and the main staircase in the neighboring house may be more modest or to the contrary their artistic adornment may be more complex--this is not the point. There is another more important point. Frequently the interiors of one or several rooms are decorated.

The interiors of old Leningrad houses are unique in their abundance and diversity. And after all, many of them are former apartments of income-producing buildings and are still associated with the lives of remarkable Russian writers, artists, architects and scholars. And by no means have all these interiors been made into museum exhibits. Perhaps this is not entirely possible today but it is our patriotic duty to preserve these riches. We must preserve, for example, Saltykov-Shchedrin's apartment at 60 Liteynyy Prospekt; Nikolay Rerikh's apartment, decorated according to his sketches, at 9/1 on the S"yezdovskaya Line on Vasilevskiy Island; architect Andrey Shtakenshneyder's study in the house which he personally built and which was once a center of cultural life in Petersburg (10 Khalturin Street....It is impossible to enumerate all of them.

However if these buildings are subjected to total capital repair, everything of value in them will be ruined. Many years of experience confirm the fact that during capital repair carved doors, panels, molding, wall upholsterings, fireplaces--all this is either scrapped or stolen and only a small part of it is dismantled and shipped to the Museum of Leningrad History.

"There is no problem whatsoever here," Vasiliy Ivanovich Yakovlev, chief of the UKR, tried to persuade me. "Our craftsmen can recreate everything down to the minutest detail." It is not difficult to understand the logic of the economic manager in the given instance. It is not profitable to perform "conservative" repair on old buildings and to repair only that which is truly in a state of disrepair. The UKR is a mighty construction organization (16,000 blue and white collar workers) with a modern industrial base (structural component plants, cabinetmaking plants, etc.). In order that the administration might make maximum use of capital investments, it tries to perform the maximum amount of the most highly mechanized and costly work, in other words, it needs volume.

Therefore there has developed in Leningrad what I consider to be the dangerous penchant for newly made things. Tearing down the old and creating an imitation in its place--such has been the principle used in the "reconstruction" of several buildings to date. This says nothing of the fact that the memorial significance of an object requires the preservation of documentary genuineness, otherwise it makes no sense whatsoever. It is impossible to recreate an old Petersburg house from the second half of the nineteenth century to the beginning of the twentieth century in its entirety today: there are no construction materials of suitable quality and the technique of their mass production and use has been lost. The result is an architectural mold, a mockup in the "retro" style.

Leningrad managers and specialists involved in capital repair work argue in almost every specific instance the need to carry out capital repair, citing the technical condition of the structural elements in old buildings. Data on this score are contained in the data of a survey of the technical condition of housing inventory. This survey was conducted by the "Lenzhilproyekt" institute between 1967 and 1971. The survey made it possible to diagnose the "illness" of every building and to determine specifically what in its "organism" required treatment and the degree of urgency.

The successful culmination of the so-called Smolnyy experiment, which was conducted in 1982 on the basis of a decision of the Leningrad City Soviet Ispolkom is a gratifying fact that can have an active impact on the comprehensive capital repair practice that has developed in Leningrad. A fundamentally new method of reconstruction was tested in the course of the experiment: building No 6 at 3 Sovetskaya Street was modernized without moving the tenants out. The work was not on an industrial scale. The floors were not replaced. They were deemed suitable for further use. The cost of modernizing the house was two-sevenths of the cost of conventional capital repair.

Everything here was unusual. "Lenzhilproyekt" specialists began their planning with...a meeting of tenants of the house. After all, unlike impersonal comprehensive capital repairs, the Smolnyy method takes into account the makeup of the family and the needs of a specific group of tenants. Their wishes were taken into account as far as possible in the plan. And only then were some of the tenants moved out to make room for equipment in brightly illuminated kitchens and new toilets.

The country's largest system for repairing old buildings is in operation in Leningrad. In the 2 decades that it has been developing, it has acquired scope, might and experience. But are there no unresolved problems? Basic attention has been concentrated on comprehensive capital repair. The volume of other, more "conservative" and economical types of repair--current and selective--has been unjustifiably curtailed. This has led to certain losses of historical and cultural assets. As a result of the mass thinning of old blocks, there has been a trend toward the loss of living space in the center of the city and as a consequence a significant reduction of the permanent residential population in the center.

Leningraders have done a great deal, but how much still remains to be done! The fate of old buildings is in large measure the fate of the city.

5013
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BUILDING MATERIALS

LACK OF COORDINATION RETARDS INTRODUCTION OF NEW MATERIALS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Aug 83 p 1

[Article by V. Zotov: "Progressive Materials for Construction Projects"]

[Text] In the technical administration of the Union Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises], where the topic of conversation was new progressive building materials, an episode was recalled which happened 8 years ago. When they were preparing the next units to be released for use at the Lebedinskiy and Stoylenskiy Ore Dressing Combines, the roofers received the so-called fused ruberoid instead of the standard roofing material. For the crews working on the roof this was, without exaggeration, a great gift. The smoking bitumen cookers were not needed, as well as the bitumen itself. They enrolled the roll, heated the fused layer with a lamp, glued it securely to the slabs, and the roof was finished. Quick and clean.

"Now we won't take any other materials," the roofers expressed their feelings about the new product.

Even a person who is not related to construction can understand them. At the overwhelming majority of sites, the roof installation still remains the most nonprestigeous and labor consumptive work. Everything must be done by hand. Of course, any steps in the direction of industrializing this process are very important. However, the number of roofers who get such rolls as those which the KMA builders liked so well eight years ago is still small.

As an example, the annual demand of the same Mintyazhstroy for rolled roofing materials comprises 100 million square meters, while it is allocated only 14 million square meters of fused ruberoid according to funds. Mintyazhstroy is no exception. On the whole, the demand of builders for this type of covering is satisfied by less than half.

The most remarkable thing is that in this case the increased production of the progressive roofing material is hindered... by the plan, which is oriented toward the output of standard ruberoid.

Let us explain the situation. As soon as an enterprise begins to manufacture fused ruberoid, the equipment productivity drops. The fabric to which a thicker layer of bitumen mixture is applied, according to the technology, is pulled

through at a slower rate than standard material. As a result, the overall amount of manufactured material is reduced. At the same time, more bitumen is spent per meter. I presume that we need not comment on the state of the indicators determining the economic success of the enterprise. And who wants to work at a loss?

A simple solution is proposed: to establish a conversion factor which would stimulate the operation of the enterprise manufacturing more labor consumptive but more effective production. However, this is not supported in the building materials section of the USSR Gosplan -- the output of rolled roofing materials in square meters would be reduced. The logic of this section's director, Yu. Kalugin, is simple -- even though it is not progressive, there is more of it. And since it is necessary to maintain the level of the overall figure, the Union Ministry of the Building Materials Industry is not quick to expand the production of the new ruberoid. For the entire five-year period, its growth is planned at 17 million square meters, i.e., by 1985 provision is made for producing 115 million square meters of this material. But the demand is 250 million! In short, the planned volumes are as yet not in favor of the roofers.

Fused ruberoid is one of the 50 types of new materials listed in the nomenclature of effective and improved products. Increased output cannot be solved for each of them by means of introducing a conversion factor or by more flexible planning. There is a shortage of raw material for the production of linoleum. Therefore, the demand for it is satisfied by barely half. The situation is similar with the raw material base for the manufacture of foam polystyrene, sealant mastics, and decorative film -- these are manufactured in amounts which are several times smaller than the demand. The gap between the demand and actual deliveries of raw material did not arise today. An analogous situation was true in both the 9th and 10th Five-Year Periods. The matter of chemization in construction is clearly being put off. However, while there is a shortage of polymer and synthetic materials, it is necessary to more actively develop other means of accelerated industrialization of construction. That is the logic of economic management.

If we judge by the reports and accounts of activity of the Union Ministry of the Building Materials Industry, in recent years it has been able to increase the output of new progressive materials and products. More high-strength and decorative cement, pre-measured decorative shaped glass, fiberglass materials, large-size colored ceramic slabs is being manufactured. Technological lines have been created for the production of high-strength mineral wool slabs and asbestos slabs by the extrusion method, as well as plasterboard sheets of improved quality.

However, as A. Yashin, minister of the building materials industry, admits in one of the documents, the demand of construction for progressive products and constructions is not being adequately met. It seems that inadequately is too mild a term. For many types of effective materials (extruded asbestos cement products, "sigran" and "sternalite" glass, gypsum-fiber slabs, high-strength gypsum, facing and hollow brick) the output volumes projected for the end of the five-year period are two to four or more times below the needs of construction. Why? We have already mentioned one of the reasons -- the shortage

of chemical raw materials is evident. There is also another important reason. A significant part of the sector enterprises are in need of radical retooling. However, the Minstroydormash [Ministry of Construction, Road, and Municipal Machine Building] has not created principally new machines and technological lines for the production of materials to meet the increased demands. Nevertheless, the main fault for the extremely low output volumes of a number of progressive products for construction should be placed specifically on Minstroymaterial [Ministry of the Construction Materials Industry].

In the first 2 years of the five-year period, the ministry's board discussed these questions 14 times. And what has been the result? Even for those materials whose production does not require outside help there has been no noticeable growth. For example, the so-called effective brick, which has been discussed for more than a year, and even for more than one five-year period, is manufactured in amounts of slightly greater than 20 percent of the overall volume of brick produced. Three or three-and-a-half times more would be required. Dry plaster mix, which makes it possible to triple or quadruple the rate of plastering work and to sharply improve the finishing quality, is also produced in small quantities.

Explaining this by the fact that the ministry is unaware of the need for plaster mix, the director of the main technical administration N. Filipovich probably himself sensed the unconvincing nature of this argumentation. With the 500 million square meters of surface area which must be plastered each year, such a mix would literally be snapped up at any construction site.

Bricklayers would be just as happy to accept blocks made of cellular concrete instead of brick as the plasterers would be to take the plaster. Each block is 16 bricks. But again the sectorial staff is slow to organize their output, although no special capacities are required. The blocks may be made at existing plants manufacturing silica brick.

There are many such examples. Their nature is similar: the ministry weakly utilizes the capacities of the sector in renewing production and does not show the necessary efficiency in those matters which can be solved by their own efforts without great effort.

As is often the case, the problem of manufacturing progressive materials and introducing them at construction sites is not synonymous. Some products the builders can't wait to get, others they reject for various reasons. This was the case with large-size plasterboard sheets. Room partitions may be made two or three times faster from these than from small-piece materials. In this case, wet processes are excluded and the weight of the building is reduced. In a word, the plasterboard meets all the requirements of industrial construction. The Minstroymaterial had to expend great effort last year to manufacture 10 million square meters of the sheets, and this year their output will be doubled. How did the contracting ministries react to this? The USSR Minpromstroy [Ministry of Industrial Construction] applied for 1.5 million square meters, the Union Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises] and Minstroy [Ministry of Construction] for 1 million each, while the Minsel'stroy [Ministry of Rural Construction] applied for 0.4 million.

What is to be done with the production? The solution at the USSR Gosplan and USSR Gosstroy was remarkably simple -- they offered to double, and for some ministries to triple the deliveries. This is easily done on paper. But what is to be done at the construction site? Partitions made of the plasterboard are twice as expensive as those made of traditional materials. The customers do not agree to the change, to all queries, they inevitably answer: do it according to the project plan. A special folder for official rejections has been started at Mintyazhstroy. The rejections are sent not only because of the divergence in price. Zinc-plated sheet steel is required for the installation of the partitions, but no funds have been allocated for it. Standard black sheet stock is being used. However, it must be painted, and first cleaned. Furthermore, relates the deputy director of the All-Union Construction-Installation Association "Soyuzspetstyazhstroy" B. Gurariy, the effect of acceleration is achieved due to rapid installation of the partition with self-threading bolts. However, their quality is such that the bolts alone do not pierce the thin metallic strip -- the holes must first be drilled. The instrumentation is of the wrong specification and goes out of order too quickly. All these unsolved minor details have negated the great advantages of the industrial partitions. Even specialized crews which have been formed at the association spent more time on the installation of these partitions than if they were erected from small-piece materials.

The sad fate of plasterboard is also shared by another new achievement in the construction industry -- the extrusion technology. It makes it possible to make panels and slabs of various function, including roofing slabs, on the basis of asbestos cement. For each square meter of product there is a savings of almost four kilograms of metal. Experimental batches of these panels were obtained at the Voskresenskiy Asbestos Cement Products Combine as early as 1977. Today two production lines are in operation with a capacity of one million square meters. However, less than one-third of them are used. This is because capacities for the production of plasticizer were not created simultaneously with the new production lines. These fall under another ministry -- that of the chemical industry. The ministry has no direct interest in these capacities, and they appeared in the new construction list only upon request of the directive organs. The introduction of the first capacities is anticipated in the last year of the five-year period. The prolonged delay, again due to non-comprehensive solution of the problem, is at the very first stage of technological development.

The building materials industry is most closely tied with construction, and determines its character and technical level. And it is specifically in this sphere that it has been impossible for a long time to attain a noticeable increase in the rate and quality of work. It is no accident that bringing order to capital construction has been presented by the party as one of the central national economic tasks. The solution to this problem greatly depends on how soon our construction sites will receive a sufficient quantity of modern building materials and products with a high degree of plant readiness.

12322
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BUILDING MATERIALS

ARCHITECT CALLS FOR BETTER QUALITY BRICK

Moscow STROITEL'NAYA GAZETA in Russian 19 Aug 83 p 3

[Article by S. Buynov, architect: "Brick in the Kiln"]

[Text] Red clay brick has long been the basic building material in the cities of our country. Many creations of Russian masters in masonry work of the past centuries have been preserved to this day and continue to worry us. Brick has also not lost its significance in our day, particularly in erecting residential and civil buildings. In the RSFSR it is used to build almost half of all the residential housing.

What is it about brick that attracts the attention of urban builders? It is a rather convenient universal masonry material which makes it possible to vary building. After all, it may be used to erect a building of any shape, to make ornamentation on a facade, frieze or cornice, as well as other elements. Even greater expression may be achieved by using decorative, colored, or glazed surface brick along with the standard red or silica brick.

Certain buildings erected in Moscow may serve as an example of the masterful use of the advantages of brick construction. For example, several years ago an attractive residential block of 12-story brick houses was built not far from Komsomol'skiy Prospekt. Their facades were masterfully done in monotone facing brick. The horizontal and vertical seam lines give the walls a geometric clarity, a harmony of color, and finish off the painted walls, lodge and balcony screens.

Brick buildings are being rather well erected in a number of other cities as well -- Leningrad, Gorky, Volgograd, Novosibirsk, Kuybyshev, Izhevsk. There, as in Moscow, soft tones of brick are being used for the facades of brick buildings, which has noticeably improved the appearance of the new blocks. Decorative brickwork on outside walls is also widely used, which gives the building facades a special expressiveness.

Many examples of the creative approach and interesting innovations in the field of brick house building may be presented. However, unfortunately, many more examples of the exact opposite plan may be cited. It is by far not everywhere that builders, local architectural services, project design

organizations, and even controlling organs of the Gosarkhstroykontrol' [State Architectural and Construction Control] give adequate attention to the quality of construction of residential and civil buildings made of brick.

Often one might find that the facing brick has not been selected either by color or by size, or that decorative brickwork has been poorly done. For example, in Zheleznogorsk in Kursk Oblast, a 14-story house was built which is far from pleasing to the eye. The brickwork is uneven, and misaligned, the seams between the layers are thick and sloppy. Even the brick itself is unmatched, often with chipped corners. A chemical plant dormitory in Tomsk and many buildings erected in the cities of the Bashkir and Udmurt Autonomous Republics, in Vladimir, Vologda, Tomsk, Kaliningrad, Tula, and a number of other oblasts have an unattractive appearance.

What are the reasons for the low quality of brick house construction?

First of all, at present there are still not enough basic building materials for outside finishing of brick buildings being manufactured. For example, in the RSFSR with an actual need for 3-3.5 billion pieces of facing and silica brick, only about 900 million are being produced. In a number of oblasts and autonomous republics where brick construction comprises a large relative share, facing brick is not manufactured at all. Among these are Tambov, Astrakhan, Kurgan, Omsk, Ryazan, Kaluga, Orel, Sakhalin, and Kamchatka Oblasts, as well as the Dagestan, Kabardino-Balkar, North Osetian, Kalmyk, Buryat, and Tuva ASSR.

Secondly, very often brick is delivered to the construction site not in containers or on pallets, but loose. As a result, about 30-35 percent of the brick is broken, and the builders are forced to lay the building walls literally out of chips.

The third reason is the shortage of well trained bricklayers who know how to do decorative brickwork, how to lay cornices and other architectural elements of building facades. The fact that the level of preparation of these specialists within the walls of the vocational-technical schools and within the construction-installation organizations themselves does not meet necessary requirements is particularly worrisome.

In order to eliminate these problems and increase the architectural and urban construction level of development, it is necessary in the near future for the enterprises of the RSFSR Minstroymaterial [Ministry of the Construction Materials Industry] and other ministries and departments to increase the output of facing brick by 2.5-3 times, with an improvement in its quality. It is also necessary to expand the assortment, perfecting the production of a sufficient amount of colored facing brick, as well as brick with organosilicate surfacing. I believe that the transport of loose brick to all facilities should be strictly prohibited.

The system of wages for bricklayers should also be improved. Presently it does not encourage the worker to improve his level of training and quality of work.

BUILDING MATERIALS

PROGRESS, PROBLEMS IN CEMENT INDUSTRY DESCRIBED

Moscow STROITEL'NAYA GAZETA in Russian 7 Aug 83 p 3

[Article by A. Boldyrev, engineer: "Multi-Purpose Raw Materials"]

[Text] The scientifically substantiated and economically expedient relation of fuel expenditures per unit of production must become an important component part of the technical policy in the cement industry. A program for fuel economy has been developed at the USSR Minstroymaterial [USSR Ministry of the Construction Materials Industry]. Among the proposed measures is the introduction of energy-saving technology and the dry method of production, as well as the transition of operating plants from the wet to the semi-dry method.

A special place in this program belongs to increased output of multi-component cements. This direction makes it possible within short periods and with minimal capital expenditures to achieve a significant reduction in the fuel expenditure. One other thing is important: the production of such a binding agent is based on the broad application of secondary resources. In the 11th Five-Year Period and for the period to 1990, the plans for economic and social development provide, in particular, for the expanded output of multi-component cements with additives consisting of active slag, ash, and other secondary materials.

The practice of mass production and application of multi-component cements has existed for over 50 years. The cement industry developed as a complex ecological-economic system. Most of the new plants have been built next to metallurgical enterprises: the Kuznetsk and Magnitogorsk, the Nizhnetagil and Karaganda, Dnepropetrovsk, Krivorozhskiy, and others. They actively utilize the "by-product" of metallurgy -- the furnace slag. According to computations by the NIITsement [State All-Union Scientific Research Institute of the Cement Industry], the cement industry in 1980 used 23.7 million 14 million tons of clinker. This is equivalent to the operational introduction of six large plants, whose construction would have required no less than 600 million rubles.

The use of slag is also advantageous to the metallurgists. Metallurgists spend approximately 1 ruble 20 kopeks for each ton of slag for the organization and maintenance of dump sites. Granulating the slag, they sell it to cement makers for anywhere from 1 ruble 60 kopeks to 2 rubles. The cement

manufacturers in turn save 30-40 percent of the fuel for the output of slag Portland cement. Also, the capital expenditures for organizing production of this binding agent at existing plants are reduced by 3.5 times as compared with the construction of new plants.

And how do the primary consumers -- the builders -- view multi-component cement? They accept it well. After all, active additives improve the quality of the binding agent. First of all, it becomes durable, capable of withstanding the corrosive effect of an aggressive environment. According to the data of the Soviet on Coordinating Scientific-Research Work in the Field of Concrete and Reinforced Concrete, today around 50 percent of the enterprises are being built in an aggressive environment. The losses from corrosion in the sphere of construction reach two billion rubles a year.

What are the prospects for developing the production of multi-component cements? We will rely on the authority of the International Congress on Chemistry of Cement, which was held in Paris in 1980. There were about a thousand participants, leading scientists from 57 countries around the world, including the USSR. The primary topic of the Congress was the examination of problems and the search for means of reducing energy expenditures for cement production. One of the acknowledged measures was the need to organize the mass output of multi-component cements with additives of from 20 to 80 percent granulated metallurgical slag, thermoelectric station entrainment ash, and natural active hydraulic additives. This would make it possible to reduce the expenditure of energy resources by 40 percent.

Unfortunately, in our country the relative share of multi-component cement production is not increasing, but dropping. The slag dump sites are increasing. Today on an area of 2,500 hectares, 450 million [tons] of slag have accumulated. The primary reason for this phenomenon is that the organization of granulated slag production has lagged behind the growth in the development of the cement industry.

Ferrous metallurgy enterprises produce 50 million tons of furnace slag annually. In recent years, metallurgists, alluding to sectorial problems, have stopped creating prefurnace granulating installations in the construction of new units as well at existing ones. For this reason, 15 million tons of slag are dumped annually. However, not 35, but approximately 29 million tons are granulated.

It is not difficult to compute that, utilizing at least an additional 10 million tons of slag in cement production, it is possible to obtain up to 20 million tons of binding agent. We might add that slag may be used to make pumice, rubble, mineral wool -- up to 15 types of materials and products for construction in all.

A huge reserve for growth in the production of multi-component cements and a wide assortment of other building materials is the ash from heat and power stations. Since we do not want to overload this article with figures, we will merely say that the reserves of this raw material are many times greater than

the reserves of furnace slag. The expenditure of means for ash removal is also correspondingly great. Huge territories are taken up for dumps. In recent years, the chemical and mineralogical properties of ash from most of the heat and power stations have been studied and their sphere of application determined. However, the volume of practical application is growing slowly, with less than 10 percent of the annual output being utilized.

Specialists are well aware that ash is not only an effective additive to cement, but also an active component in raw material mix. Its introduction into raw material mix instead of clay or even the partial replacement of clay guarantees a 15-18 percent reduction in the fuel expenditure.

The widespread application of ash for liming soil, for making cement and numerous building materials has been established by law in this country. However, the USSR Minenergo [Ministry of Power and Electrification] is not creating the necessary number of ash removal systems for its processing and is not erecting the needed silos for storage and installations for loading the raw material into ash hauling trucks. Repeated critical comments in the press, including also in STROITEL'NAYA GAZETA, and the proposals of on-site specialists have essentially met a "wall of silence." Meanwhile, the ash dump sites are growing. Today they take up an area of 113,300 hectares, and the state spends 100 million rubles each year to maintain them.

The cement industry is developing. Specialists have computed that the construction of slag drying sections and the installation of additional mills at existing and expanding cement plants and at those under construction which will be placed into operation in 1983-1985 will make it possible to significantly increase the output of slag Portland cement and to save an additional million tons of fuel in the final year of the five-year period. However, the achievement of this task vital to the national economy depends not only on the building materials industry, but also on the active participation of the USSR Minchermet [Ministry of Ferrous Metallurgy] and USSR Minenergo in this sphere.

12322
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BUILDING MATERIALS

USE OF SAND IN CONCRETE PRODUCTION PROPOSED

Moscow STROITEL'NAYA GAZETA in Russian 29 Jul 83 p 2

[Article by A. Volzhenskiy, professor of the Moscow Order of Red Labor Banner Engineering-Construction Institute imeni V.V. Kuybyshev, Lenin Prize laureate, RSFSR honored scientist and technologist: "Our Familiar Sand"]

[Text] Many regions of the country lack rock suitable for making rubble. Therefore, it is often transported 300-500, and sometimes even 1,000 kilometers to places of consumption. Thus, up to 300 million tons of this building material are shipped annually, as a result of which its average cost to the consumer reaches 7-8, and sometimes 25-30 rubles per cubic meter.

Sand deposits are more widespread, and their mining and processing is less capital consumptive. Therefore, specialists are putting more effort into finding ways of replacing rubble with sand in concrete.

Research conducted in the past 10-15 years and experience in the application of sand concrete in various structures have confirmed their economic and technical expediency. Here are several examples.

The manufacture of various reinforced products without the use of any gravel has been organized in Vologda. In the manufacture of 40,000 cubic meters per year, the savings amounted to 200,000 rubles. Grade "200" sand concrete was used for building the canal slopes of the Riga Heat and Power Station, with cement expenditure of around 300 kilograms per cubic meter. Glavleningradstroy, [Main Administration for the Housing, Civil Engineering and Industrial Construction of the Leningrad Gorispolkom], in conjunction with LISI [Leningrad Order of Red Labor Banner Engineering-Construction Institute], has developed equipment for molding products out of such materials with a strength of from 200 to 500 kilograms per cubic centimeter. In this case the specific expenditures of cement is close to the expenditure standards for ordinary concrete.

The Severgazstroy Trust of Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] rejected rubble costing 50 rubles per cubic meter which was brought in from a distance of 1,000 kilometers and organized the manufacture of products based on local river sand (at a cost of 5 rubles per cubic meter). Here, even considering the increased cement expenditure, the cost of the concrete was reduced by 30 rubles per cubic meter.

In many rayons of Central Asia there is often an acute shortage not only of rubble, but also of standard grades of sand. At the same time this area has inexhaustible reserves of barkhan sand, which by current notions is unsuitable for the manufacture of reinforced concrete constructions.

However, this is not true. Approximately 10 years ago at the initiative of A. Charyyev, director of the Glavkarakumstroy [Main Administration for Housing and Civil Engineering Construction in the Kara Kum] under the USSR Minvodkhoz [Ministry of Land Reclamation and Water Resources], with the involvement of MISI and the Institute on Aseismic Construction of the TSSR Gosstroy, research was begun on barkhan sand for the purpose of using it in the production of building products. Experience in the mass manufacture and application of construction of Glavkarakumstroy sites has been described in STROITEL'NAYA GAZETA (No 44, 13 April 1983). There are numerous examples of the successful production of sand concrete products. Nevertheless, they are still insufficiently used, even though all the preconditions are present.

Constructions made of sand cement are 10-15 percent lighter than those made of standard cement, and with the addition of coal ash to them they are 20-25 percent lighter, which facilitates a reduction in the specific capital investments, steel and fuel expenditure. Sand concretes have better coefficients of homogeneity, prismatic strength, and frost resistance. With the use of chemical additives, ash, improved mixing and molding mechanisms, and finally new types of binding agents, the cement expenditures are reduced to those of standard values for concrete containing rubble. In particular, cements have been created at MISI which reduce the expenditure of the clinker component to 200-280 kilograms per cubic meter of concrete.

On the whole, the replacement of rubble with sand in concrete in the central regions of the country gives an economy of 2.7 rubles per cubic meter, in Central Asia -- 13.9 rubles, and in Siberia -- up to 29.9 rubles.

Nevertheless, the application of sand concrete in construction is hindered not only for the above-mentioned reasons. A significant role is played also by a lack of understanding of its properties on the part of the producers, as well as their adherence to tested classical concrete, etc. However, the basic reason is evidently the evaluation of the enterprises' activity in plan fulfillment in monetary expression and "by value." The more expensive the rubble-containing concrete construction, the more advantageous it is for the enterprise, though not for the state.

To solve this problem it is especially necessary to implement a complex of measures, and primarily economic measures, which in particular would consider the principle of standard-net production. Evidently it is necessary to mandate all enterprises manufacturing concrete and reinforced concrete products based on rubble to develop and implement economically and technically substantiated measures for the production of constructions made of sand concrete. Widespread assistance in this matter must be given to the plants by the organizations on technical construction and scientific-research institutes under the control of the appropriate ministries and the USSR Gosstroy.